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Repair Manual
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 Audi A6 1995 ➤ , Audi A6 1998 ➤
 Audi A8 1994 ➤ . Audi A8 2003 ➤ .
 Audi Cabriolet 1991 ➤ , Audi A3 2004 ➤ ,
 Audi TT 1999 ➤ , Audi A6 2005 ➤ ,
 Audi Q7 2007 ➤ , Audi TT 2007 ➤
 Audi R8 2007 ➤ , Audi A5 Coupé 2008 ➤ ,
 Audi A4 2008 ➤ . Audi Q5 2008 ➤ .
 Audi A5 Cabriolet 2009 ➤
 Audi A8 2010 ➤ , Audi A1 2011 ➤ ,
 Audi A7 Sportback 2011 ➤
 Audi A6 2011 ➤ , Audi Q3 2012 ➤
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 Audi A7 Sportback 2018 ➤ .
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 Audi A1 Sportback 2018 ➤ ,
 Audi Q3 China 2019 ➤
 Audi Q3 Sportback 2020 ➤ .
 Audi A3 2021 ➤
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Wheel and Tire Guide General Information

Edition 01.2024



List of Workshop Manual Repair Groups

Repair Group

44 - Wheels, Tires, Wheel Alignment



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Technical information should always be available to the foremen and mechanics, because their careful and constant adherence to the instructions is essential to ensure vehicle road-worthiness and safety. In addition, the normal basic safety precautions for working on motor vehicles must, as a matter of course, be observed.

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Wheels, Tires, Wheel Alignment

Wheel and Tire Guide, General Sec-1

(Edition 01.2024)

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Wheel and Tire Guide, Guidance on the Application

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- ⇒ "2.7 NEFZ, WLTP and RDE", page 6

2.1 Guide

2.1.1 Guide, General Information

The guide contains general information for:

- ♦ Conversion requirements
- Assembly instructions / information on wheels, tires, temporary spare tires and snow chains
- Fault Finding; possible sources of malfunction
- ♠ Explanations of tire packages in NEFZ and WLTP. Refer to ⇒ "2.7 NEFZ, WLTP and RDE", page 6.

2.1.2 Wheel and Tire Guide, Vehicle Specific Section

The wheel and tire guide vehicle-specific section contains information about:

- ♦ Wheel/tire combinations approved by the manufacturer
- Conversion options approved by the manufacturer
- Explanations of tire packages in NEFZ and WLTP.

2.2 General Information

Our Audi vehicles are engineered based on the latest developments in safety technology. To keep it that way, it is recommended to use only original Audi replacement parts. These can be recognized by the VW / Audi trademark and by the part number. These replacement parts are known to be reliable, safe and suitable.

Despite ongoing market survey, we cannot assess other products on these points, even where in individual cases they have been passed by official inspectors or have been granted official approval. Therefore, we cannot assume any liability if these products are installed.





Note

- Products from original Audi original replacement parts AOT and Audi accessories AOZ may differ in regards to assembly requirements, tightening specifications, etc.
- Pay attention to the different tightening specifications for the wheel bolts.
- Pay attention to the assembly and installation instructions.

The wheel and tire combinations or retrofittings listed in the vehicle tables refer exclusively to Audi original disc wheels.

- All winter tire combinations approved for a vehicle can also be driven in summer with the appropriate tread.
- All summer tire combinations approved for a vehicle can also be driven in winter with the appropriate tread. Keep in mind that snow chain do not fit on summer tire combinations.



Note

- Only winter tires which have the "snowflake symbol" are approved as winter tires.
- ◆ The designation M+S is not an indicator of an approved winter tire.

2.3 Information

- Pay attention to the type and size of snow chains. Refer to
 ⇒ Owner's Manual, Snow Chains .
- Pay attention to the legal regulations of countries regarding possible snow chain laws.
- All summer tire sizes listed in the vehicle documents can also be driven as winter tires with the appropriate tread!
- Potedtals/recommended to/use wintentires with the tire size by permiwhich snow chains can be used Refer to or where Manwitual Snow Chains of Information in this document. Copyright by AUDI AG.
- The "snowflake symbol" must be clearly visible on winter tires.
- Only when using winter tires is it permitted that the highest speed attainable by the vehicle lies above the highest speed of winter tires specified by the speed symbol. If this is the case, an information label must be placed in the driver field of vision.

There is always only one tire package allocated to the vehicle in the certificate of registration section 1.

2.4 Explanations about Regions

The following information lists the countries that are combined into a region.

Pay attention to the legal regulations of single countries and regions about the appropriate importer.

Region	Countries in the region	Countries in the region	
AGCC (Arab Gulf Cooperation Council)	Bahrain	Bahrain	
	Qatar		
	Kuwait		

Region	Countries in the region
	Oman
	Saudi Arabia
	United Arab Emirates
Europe	Belgium
	Germany
	France
	Spain
	Portugal
	Italy
	Austria
	Switzerland
	Netherlands
	Luxemburg
	Poland
	Czech Republic
	Romania
	Slovakia
	Hungary
	Slovenia
	Croatia
	Great Britain
North America	USA
	Canada
Scandinavia Protected by Copyright. Copyright	Denmarkantee or accept any liability
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	Sweden
	Norway
South America	Argentina
	Brazil
	Bolivia
	Chile
	Ecuador
	Columbia
	Paraguay
	Peru
	Uruguay
	Venezuela

2.5 Tire Package Definition

To increase energy efficiency, environmental protection, and driving safety special tire packages were developed by the Audi AG for every vehicle model and assembled based on the engine.

To attain an efficient product for the final consumer, the tire packages were developed to reduce CO_2 emissions according to a European Union requirement and also to maintain country-specific tax provisions.



Additional information about the CO₂- emission and the roll resistance. Refer to \Rightarrow "8.4 EU Tire Label", page 74.

There are three options for determining the tire package assigned to a vehicle:

- Using the version key in the certificate of registration section 1. Refer to ⇒ "2.6.1 Certificate of Registration Section 1", page 5
- Using the version key in the certificate of registration sec-
- Using the version key in the EG declaration of compliance (COČ-paper). Refer to ⇒ "3.5 Certificate of Conformity (EG Certificate of Conformity)", page 11

2.6 **Determining the Correct Tire Package** Using the Version Key

⇒ "2.6.1 Certificate of Registration Section 1", page 5

⇒ "2.6.2 Additional Information about Determining Correct Tire Package", page 6

There are three options for determining the tire package assigned to a vehicle:

- Using the version key in the certificate of registration section 1. Refer to ⇒ "2.6.1 Certificate of Registration Section <u>1", page 5</u>
- Using the version key in the certificate of registration sec-2 tion 2
- Using the version key in the EG declaration of compliance (COC-paper). Refer to ⇒ "3.5 Certificate of Conformity (EG Certificate of Conformity)", page 11
- Breakdown of the version key in the certificate of registration section 1 under D2. Refer to ⇒ "2.6.1 Certificate of Registra-<u>tion Section 1", page 5</u> .
- Selecting a possible wheel/tire combination. Refer to ≥ "2.1.2 Wheel and Tire Guide, Vehicle Specific Section", page 2.

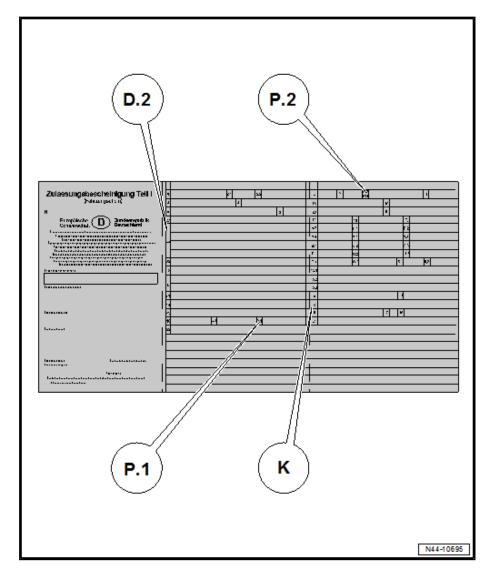
Example:

- Protected by copyright, Copying for private or commercial purposes, in part or in whole, is not 1 - The displacement in cm3 is in the certificate of registration or accept any liability section 1 under Ph1 and the output in kW can be found under ight by AUDI AG. P.2; this shows which engine with which output is installed in the vehicle.
- 2 The code e.g. RT01 is included in the version key for the tire package.
- 4 With these three selection criteria it is possible to determine the wheel/tire combination of the actual vehicle. Refer to ⇒ '2.1.2 Wheel and Tire Guide, Vehicle Specific Section", page

Refer to ⇒ "2.6.2 Additional Information about Determining Correct Tire Package", page 6

Certificate of Registration Section 1 2.6.1

- D.2 Contains the Variant Key and the Version Key
- K Contains the type approval number
- P.1 Displacement in cm³
- P.2 Power Rating in KW



2.6.2 Additional Information about Determining Correct Tire Package

Also pay attention to the vehicle data of the respective vehicle for an additional determination of:

- The size of the front brake rotors via the appropriate PRnumber.
- 2 -The corresponding suspension data PR numbers such as air suspension etc.

2.7 NEFZ, WLTP and RDE

- ⇒ "2.7.1 What are NEFZ, WLTP and RDE?", page 6
- ⇒ "2.7.2 What is the difference between WLTP and RDE?", page 7
- ⇒ "2.7.3 Since when do WLTP and RDE apply it on part or in whole, is not apply it of a page when by Copyright. Copyright or private or commercial purposes, in part or in whole, is not apply it of a page who rised by AUDI AG. AUDI AG does not guarantee or accept any liability ectness of information in this document. Copyright by AUDI AG.

What are NEFZ, WLTP and RDE? 2.7.1

NEFZ ("Neuer Europäischer Fahrzyklus") New European Driving Cycle describes a dynamometer measurement that has been used in Europe since 1992, to determine the exhaust



emissions and fuel consumption of passenger vehicles and light commercial vehicles.

The NEFZ has been replaced by the world wide test method WLTP ("Worldwide Harmonized Light-Duty Vehicles Test Procedure"). The new procedures should show a more realistic picture of the consumption of a vehicle and is based on a different test cycle with stricter inspection requirements.

In addition to WLTP in Europe the emissions should also be determined according to the RDE test procedure ("Real Driving Emissions"), in which the measurement is taken in traffic conditions.

2.7.2 What is the difference between WLTP and RDE?

For WLRP a vehicle is driven for 30 minutes on a roller test stand under standard parameters, the RDE test takes place in the open street. For the RDE measurement a one third mixed route is used (1/3 city, 1/3 country. 1/3 highway). The RDE measurement takes between 90 and maximum 120 minutes.

2.7.3 Since when do WLTP and RDE apply?

From September 2017 there is a successive switch to WLTP and RDE. From September 2018 the WLRP test procedure is required for all new vehicles as well as the limiting particle numbers (PN) in RDE. From September 2019 a RDE threshold for nitrogen oxide (NOx) is required for all new registrations.



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3 Legal and Technical Requirements (documents)

- ⇒ "3.1 Legal Requirements", page 8
- ⇒ "3.2 Technical Requirements", page 9
- ⇒ "3.3 Load Rating Depending on Speed and Winter Tires", page 9
- "3.4 Vehicle Registration Documents since 10/01/2005", page
- ⇒ "3.5 Certificate of Conformity (EG Certificate of Conformity)", <u>page 11</u>
- ⇒ "3.6 EU Type Approval Number, Sales Code and Sales or Brand Name", page 11

Legal Requirements 3.1

The manufacturer is granted general type approval for the whole vehicle including all parts and for specific retrofitting (general type approval according to § 20 StVZO (Motor Vehicle Construction and Use Regulations or EU type approval).

Retrofitting to wheels and tires can only be made under certain circumstances. At the same time pay attention to the following points:

If the wheel and tires sizes along with the load index and speed symbol are contained in the general type approval or EU operating license, then this tire/wheel combination can be mounted on the vehicle.

It is not necessary to install the wheel/tire combination specified in the registration certification Part I (vehicle registration). All combinations approved in the general type approval for the vehicle or the EU operating license can be mounted on the vehicle.

- There is no general type approval according to § 22 StVZO for the retrofittings recommended (see approval certificate) ole, is not
- If the wheels and/or tires are not contained in the general UDI AG. type approval or EU type approval, then vehicle cannot be retrofitted according to the Vehicle Registration Regulation (VRR) specifications.

These statements refer to legal requirements in the European Union. No claims are made as to their completeness. Other legal requirements apply outside the European Union.

The tables of the approval certificate show the recommended and examined by the technical testing organization wheel and tire combinations for the vehicles and at the same time the conditions to be taken into account. The use of original disc wheels on a vehicle to which they have not been assigned is not permitted.

The possible retrofittings shown here are combinations which meet the requirements for handling and driving safety. They are the results of practical tests and for this reason they are recommended.



Observe the information regarding new vehicle certification documents since 10/01/2005.

3.2 **Technical Requirements**

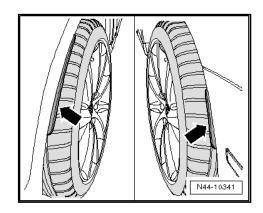
- The wheel and tire combinations or retrofittings listed in the individual vehicle tables refer exclusively to original disc wheels.
- Approval of wheel/tire combinations or retrofittings with disc wheels from the accessories trade is not possible with the accompanying parts certificate.
- Tubeless radial tires may only be used with fapered beard the protected by copyright. Copying for private or commercial purposes, in part or in whole, is not a commercial tires may only be used with fapered beard the protected by AUDI AG. AUDI AG does not guarantee or accept any liability approaches of information in this document. Copyright by AUDI AG. ess of information in this document. Copyright by AUDI AG. seat rim with a safety bead seat, for example a round hump.
- Run-flat tires (reinforced sidewall) may only be used on disc wheels with extended hump and vehicles with a tire pressure monitoring system.
- The correct tire inflation pressure values must be observed when the specified wheel and tire combinations are used. The tire pressures are listed on the tire pressure label on the inside of the fuel filler door and on the driver side B-pillar.
- Sufficient clearance between the wheels and tires and the wheel housing-, suspension- and brake components is ensured if the instructions and conditions specified in the approval certificate are observed under all operating conditions.
- If not otherwise specified, snow chains may be mounted only on the drive wheels. If the vehicle has AWD, then snow chains may be used on the front wheels only.

Additional Wheel Housing Extensions, FLAPS

On some vehicles with certain wheel/tire combinations, wheel housing enlargements (FLAPS) must be attached on the fenders or bumper for certification/technical reasons -arrows-.

Please check whether FLAPS must be installed.

The necessary wheel/tire combination information can be found in the overview table for the respective vehicle.



Load Rating Depending on Speed and 3.3 Winter Tires

Permission stipulations in Germany

Only when using winter tires is it permitted that the highest speed attainable by the vehicle lies above the highest speed of winter tires specified by the speed symbol.

In this case, an information label must be applied with the following content:

Attention, winter tires!		
Maximum permissible speedkm/h		





Note

This information label must be in the driver's field of view!



Note

We want to point out that in Germany, only tires with a visible "snowflake symbol" are approved as winter tires.

3.4 Vehicle Registration Documents since 10/01/2005

The implementation of EU guideline 1999/37/EG "Vehicle registration documents" in national legislation and legal data protection requirements have made the introduction of new, fraud resistant registration documents necessary.

Since 10/01/2005, the new documents are issued by the authorities in the case of new registrations, change of owner, entry or private or commercial purposes, in part or in whole, is not of technical changes and all other changes permitted unless authorised by AUDI AG. AUDI AG does not guarantee or accept any liability of technical changes and all other changes ermitted unless authorised by AUDI AG. AUDI AG does not guarantee or accept any lial with respect to the correctness of information in this document. Copyright by AUDI AG.

The new registration documents consist of:

- The registration certificate part I, which replaces the vehicle registration and
- The registration certificate part II that supersedes the vehicle

Registration certificate part I (vehicle registration)

- contains all technical vehicle data that must be present to register a vehicle in Europe but only a standard approved wheel/tire combination is specified
- has the EU-wide alphanumeric codes allocated to the technical data so that the German certificate of registration can be converted without problems in the foreign countries of the EU into the registration document required there
- contains a field to document the temporary or final decommissioning of the vehicle and is no longer drawn in the case of a temporary or final decommissioning.

Registration certificate part II (vehicle title)

- contains information that the bearer of the registration certificate is not declared the owner
- only contains the current and, if available, last vehicle owner, the actual number of previous owners is indicated numerical-
- only contains a small portion of the technical vehicle data
- does not document temporary vehicle decommissioning In the future, the vehicle and body type listed under digit 1 in the old vehicle documentation will no longer exist. It is replaced in the new documents with EU-standardized vehicle classes with body type

The introduction of the new registration documents results in hardly any changes for the driver.

As with the old vehicle registration the registration certificate part I (vehicle registration) should be kept in the vehicle and presented to responsible persons upon request.

It is not necessary to install the wheel/tire combination specified in the registration certification Part I (vehicle registration). All



combinations approved according to the vehicle general type approval or EU operating license/type approval can be used.

The permissibility of a wheel/tire combination that deviates from the vehicle general type approval or EU type approval must be verified with an entry in the registration certificate part I (vehicle registration), an installation certificate due to a parts certificate or a general type approval for the wheel/tire combination.

3.5 Certificate of Conformity (EG Certificate of Conformity)

The vehicle manufacturer must request an EU type approval for all passenger vehicles (vehicle class M1).

A certificate of conformity is produced based on this type appro-

This document confirms that the vehicle conforms to the EU operating license and is registered in every EU country without the need for individual approval.

The issuing applies to all vehicles that were produced in accordance with the EU operating license.

These vehicles have an EU type plate (black sticker) in the driver door area or in the engine compartment on older vehicles.

The certificate of conformity has the same importance as the certificate of registration, so the original should not be kept in the vehicle.

In the certificate of conformity additional technical data and all permitted wheel/tire combinations are listed.

3.6 **EU Type Approval Number, Sales** Code and Sales or Brand Name

Since 01/01/1998, all passenger vehicles licensed for road use within the European Union must possess type approval accord private or commercial purposes, in part or in whole, is not ing to EU guidelines . Vehicles licensed for moadeuse with sin 4UDI AG. AUDI AG does not guarantee or accept any liability gle-vehicle approval according to § 21 StVZO in Germany are of information in this document. Copyright by AUDI AG. excepted.

Therefore, the same guidelines apply to all automobile manufacturers. Consequently, international trade within the EU has been simplified.



4 Wheel, Changing

- ⇒ "4.1 Assembly Instructions", page 12
- ⇒ "4.2 Wheel Centering Seat, Protecting against Corrosion", page 15
- ⇒ "4.3 Wheel, Mounting", page 16
- ⇒ "4.4 Anti-Theft Wheel Bolt Positioning on Steel Wheels", page 18

4.1 Assembly Instructions



CAUTION

For ceramic brakes, the wheel must not fall on the brake rotor, otherwise it will be irreparably damaged. To remove/mount the wheel, install the long assembly pin instead of wheel bolts at the top position (12 o'clock position) and insert the short assembly pin in the wheel bolt mounts for support. This way, the wheel can glide on the assembly aids when removing/installing.

Special tools and workshop equipment required

♦ Torque Wrench, 40-200Nm - V.A.G 1332A-



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♦ Wax Spray - D 322 000 A2-

Vehicles with tire pressure monitoring sensor.

If wheels are changed (for example, change from summer to winter tires), wheel electronics send data as soon as speed of new wheels exceeds 25 km/h (15.5 mph). The control module automatically recognizes the identification numbers of the new wheel electronics.

An acceleration data check also occurs with vehicle speed. This process takes about 7 minutes.

Tire Pressure Monitoring Control Module - J502- must first switch to learning mode before it can automatically learn wheel electronics.

Vehicle must stand for 20 minutes for this. This takes five minutes after a recognized tire puncture.

If the standing time is not followed, control module is not in learning mode so system recognizes a malfunction and can only automatically learn wheel electronics after standing 20 minutes.





Note

- When changing wheels, be sure to install only vehicle manufacturer approved wheel/tires combinations with tire pressures listed on the tank flap.
- If unapproved wheel/tire combinations are installed, they must have a certificate from a technical testing organization for the particular vehicle and a second wheel set must be programmed using the ⇒ Vehicle diagnostic tester.
- ♦ An adaptation is also needed if tire pressure deviates from pressures given on fuel filler flap.

Wheel sets with other specified tire pressures

If a vehicle is equipped with tires which have specified pressures different from those listed on fuel filler flap, these tires (second wheel set) can also be monitored by the Tire Pressure Monitoring System (TPMS).

Specified tire pressures for a second wheel set must be entered into the system using the ⇒ Vehicle diagnostic tester.

Wheel electronics on wheels from second set are not automatically recognized and learned by the tire pressure monitoring system (as wheel electronics on vehicle manufacturer approved wheel/tire combination set are).

To change to a second wheel set, the following steps must be carried out:

- Read the wheel electronic (tire pressure sensors) identification numbers (IDs) before installing
- Switch the TPMS to wheel set 2.
- Enter needed specified tire pressures and wheel electronic IDs in system.

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Note

The wrench size of the included wheel bolt adapter can be vary from the wrench size of the respective master set.

Switch off the ignition.



Corrosion, dirt, oil and grease can cause the wheel bolts and wheels to become loose.

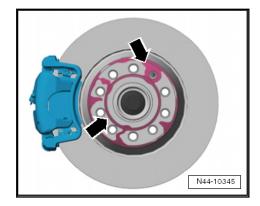
Clean the affected parts and areas.



Note

After removing or installing one or multiple tires, the tire pressure monitoring system must be recalibrated for vehicles with tire pressure monitoring system using the ⇒ Vehicle diagnostic tester.

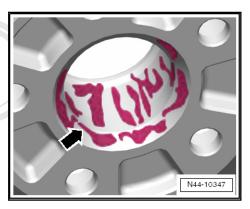
Make sure the contact surfaces -arrows- on the brake rotor are free of corrosion and dirt.



Make sure the contact surfaces -arrow- on the wheel hub center seat are free of corrosion and dirt.



Make sure the contact surface -arrow- on the wheel inner side (rim) as well as the central seat in the rim is free of corrosion and dirt.

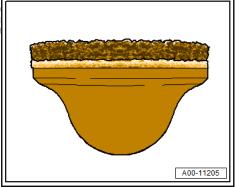


Remove rust and dirt with the Wheel Hub Cleaner - VAS 294, in part of commercial purposes, in part 009permitted unless authorised by AUDI AG. AUDI AG does not guarantee or



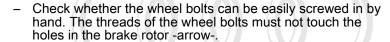
Wear protective eyewear when cleaning with the Wheel Hub Cleaner - VAS 294 009- .

Always wear protective eyewear when cleaning with the Wheel Hub Cleaner - VAS 294 009- .



ability

- Remove rust and dirt on all contact surfaces of the wheel hub and rim using the Wheel Hub Cleaner - VAS 294 009-.
- If necessary, remove oil, grease and corrosion.
- The spherical caps * in the wheel bolt openings and the wheel bolt threads must likewise be free of corrosion, dirt, oil or grease.
- * The spherical cap is the curved surface of a section of a sphere.



If the thread of the wheel bolt touches the hole -arrow-, turn the brake rotor accordingly.

Remove any dirt or corrosion if necessary:

- Oil or grease from the contact surfaces
- Oil or grease from the threads on the wheel hub
- Oil or grease from the threads on the wheel bolts hole is not



Heavily corroded, difficult to turn and/or damaged wheel bolts can become loose.

Wheel bolts must be replaced.

Applies to light-alloy and steel wheels

When a wheel is changed, the wheel centering seat should be sprayed with Wax Spray to prevent corrosion between the wheel centering seat and the rim. Refer to ⇒ Electronic Parts Catalog (ETKA) . Refer to ⇒ "4.2 Wheel Centering Seat, Protecting against Corrosion", page 15

4.2 Wheel Centering Seat, Protecting against Corrosion

Applies to light-alloy and steel wheels

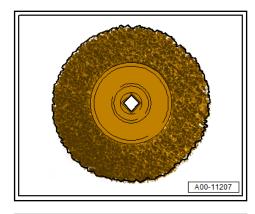
When a wheel is changed, the wheel centering seat should be sprayed with Wax Spray to prevent corrosion between the wheel centering seat and the rim. Refer to the ⇒ Electronic Parts Catalog (ETKA).

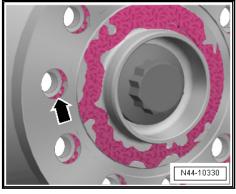
- Remove the wheel.
- Thoroughly clean the centering seat on the wheel hub and the centering surface on the rim.



Brakes can become contaminated while driving and thereby result in poor braking.

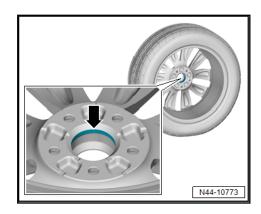
Only wax the rim centering.





Always make sure that only centering -arrow- is waxed and not rim contact surfaces. As a consequence, the brakes would become contaminated while driving and thereby result in poor braking.

Apply wax in area of centering -arrow- using a brush.



4.3 Wheel, Mounting



CAUTION

For ceramic brakes, the wheel must not fall on the brake rotor, otherwise it will be irreparably damaged. To remove/mount the wheel, install the long assembly pin instead of wheel bolts at the top position (12 o'clock position) and insert the short assembly pin in the wheel bolt mounts for support. This way, the wheel can glide on the assembly aids when removing/installing.



Note

- Only raise vehicle at designated mounting points.
- On vehicles with alloy wheels, do not pry out cover caps with a screwdriver but rather use only the special tool designed for this (puller hook in vehicle tool kit).
- To loosen wheel bolts, use sockets in the correct size. Worn out sockets must not be used any more.
- Do not use an impact wrench to loosen anti-theft wheel bolts (lockable wheel bolts).
- Do not make wheel bolts dirty.



NOTICE

The secure seating of the wheel bolts and the wheels is only ensured if the instructions and checks below are followed.

The following checks and instructions must be performed with wheel (rim) removed!



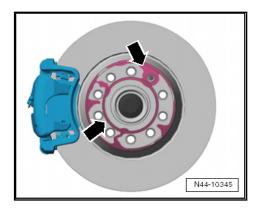
(I) NOTICE

is not The wheel bolts are different lengths and have ball bearing AUDI AG. pt any liability surfaces depending on the model.

Make sure the correct wheel bolts are installed. Refer to ⇒ Electronic Parts Catalog (ETKA).

The wheel bolts and wheels will only be secured correctly if the correct wheel bolts are used.

Clean any corrosion or dirt from the contact surfaces -arrows- on the brake rotor/wheel hub or brake rotor/brake drum and the wheel (rim).

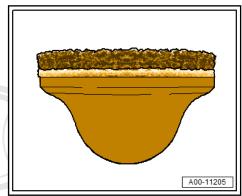


Remove rust and dirt with the Wheel Hub Cleaner - VAS 294 009-



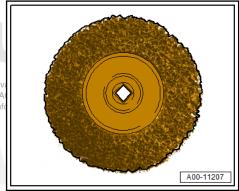
Wear protective eyewear when cleaning with the Wheel Hub Cleaner - VAS 294 009- .

Always wear protective eyewear when cleaning with the Wheel Hub Cleaner - VAS 294 009- .

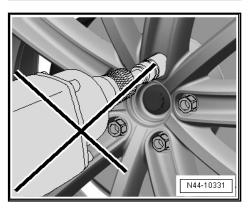


Remove rust and dirt on all contact surfaces of the wheel hub and rim using the Wheel Hub Cleaner - VAS 294 009-

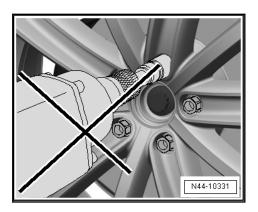




- Coat the wheel centering seat with protective material. Refer to ⇒ "4.2 Wheel Centering Seat, Protecting against Corrosion", page 15.
- When mounting a wheel, tighten all-wheel bolts evenly by
- Tighten the wheel bolts diagonally to approximately 30
- Do not use an impact wrench. Wheel bolts installed with an impact wrench can become loose.
- Lower the vehicles onto the floor. Using the torque wrench, tighten all-wheel bolts to the tightening specification in a diagonal sequence. Refer to ⇒ Wheel and Tire Guide; Rep. Gr. 44; Wheels, Tires; Wheel Bolt Tightening Specifications.



If necessary, remove oil, grease and corrosion.



Anti-Theft Wheel Bolt Positioning on 4.4 Steel Wheels



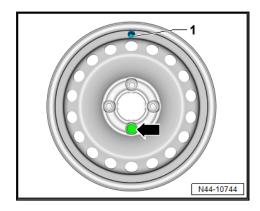
The full wheel cover can become loose while driving and fall off.

- Install the anti-theft wheel bolt at the correct position.
- Otherwise the secure fit and centering of the full wheel cover is not ensured.

Steel wheels with four holes

The anti-theft wheel bolt -arrow- must only be installed across from the valve -1-.

The decorative wheel hubcap can be installed on the steel wheel securely only when the anti-theft wheel bolt is installed in this position.

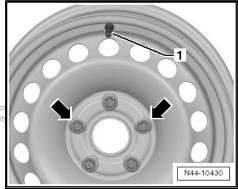


Steel wheels with five holes

The anti-theft wheel bolt must be installed either to the right or to the left -arrows- of the valve -1- on steel wheels.

The decorative wheel hubcap can be installed on the steel wheel securely only when the anti-theft wheel bolt is installed in this position.

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5 Tires, Mounting

- ⇒ "5.1 Component Overview Alloy Wheel", page 19
- ⇒ "5.2 Component Overview Run-Flat Tires, Audi Pax Tires", page 19
- ⇒ "5.3 Tires, Dismounting", page 19
- ⇒ "5.4 Tire Sealant, Removing", page 20
- ⇒ "5.5 Tires, Dismounting", page 20
- ⇒ "5.6 Tires, Bringing to Mounting Temperature", page 23
- ⇒ "5.7 Tires, Mounting", page 25
- ⇒ "5.8 Tires and Rims, Matching", page 29
- ⇒ "5.9 Tire and Wheel Radial and Lateral Run-Out, Checking", page 30
- ⇒ "5.10 Wheels and Tires, Matching", page 33
- ⇒ "5.11 Hunter RFT33VAG Road Force Touch™ Wheel Balancer VAS 6230B4 ", page 35
- ⇒ "5.12 Wheel, Balancing", page 35

Tire Sealant, Disposing. Refer to ⇒ "9 Tire Sealant", page 87.

- 5.1 Component Overview - Alloy Wheel
- ⇒ "14 Component Overview", page 129
- 5.2 Component Overview - Run-Flat Tires, **Audi Pax Tires**
- ⇒ "14 Component Overview", page 129

5.3 Tires, Dismounting

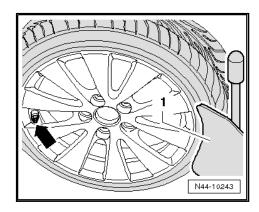
Remove the valve insert.

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Note

- If equipped handle the glued-on wheel trim carefully. Surface slightly scratched.
- Replace the damaged rim wheel trim.
- Place the press-off blade -1- over the tire valve -arrow- and maximum 2 cm away from rim flange.
- Remove the balance weight and any coarse dirt from the rim.

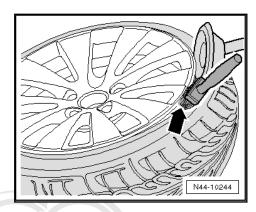


Press off both tire beads all the way around and thoroughly apply tire mounting paste between the tire and rim flange -arrow-.



Note

Avoid strong braking or acceleration maneuvers during the first 100 to 200 km (62.1 to 124.3 miles). Otherwise due to the tire mounting paste the tires can distort on the rim.



5.4 Tire Sealant, Removing

- Place the wheel on a flat surface.
- Remove the valve insert.



CAUTION

Tire sealant is harmful to health.

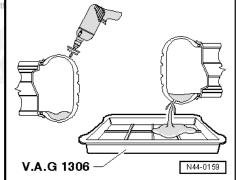
Eye and skin irritation as well as allergies are possible.

- Wear safety gloves.
- Wear protective eyewear.

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- Using a drill or cutting bit, carefully drills hale in the dire information in shoulder area.
- Hold the wheel over a drip tray and let the sealant flow out.
- Remove the tire from the rim.

Tire Sealant, Disposing. Refer to ⇒ "9 Tire Sealant", page 87.



5.5 Tires, Dismounting

⇒ "5.5.1 Tires, Dismounting, Wheels without and with Tire Pressure Monitoring System", page 20

⇒ "5.5.2 Tires, Dismounting, Run-Flat Tires, Ultra High Performance Tires", page 21

⇒ "5.6 Tires, Bringing to Mounting Temperature", page 23

5.5.1 Tires, Dismounting, Wheels without and with Tire Pressure Monitoring Sys-

If equipped check the tire pressure monitoring sensor with the vehicle diagnostic tester and if necessary replace.





Note

- When cleaning disc wheel (rim), the tire pressure monitoring sensor (if equipped) must not come into contact with water or be blown with compressed air.
- If equipped handle the glued-on wheel trim carefully. Surface slightly scratched.
- Replace the damaged rim wheel trim.
- Place the wheel with tire on the tire dismounting/mounting machine.
- Turn the wheel until the tire valve or the tire pressure monitoring sensor is a minimum of 30° before the mounting head.
- Pry the upper tire bead with the tire iron over the mounting finger.
- Remove the tire iron.
- Let tire mounting device run clockwise until upper tire bead lies completely above the rim flange.
- Turn the wheel until the tire valve or the tire pressure monitoring sensor is a minimum of 30° before the mounting head.
- Pry the lower tire bead with the tire iron over the mounting finger.
- Insert the plastic mounting lever.
- Remove the tire iron.
- Hold the lower tire bead from the outside above the wheel rim flange with the plastic lever -1-. Let the tire mounting device run clockwise until the tire is completely off the wheel rim.



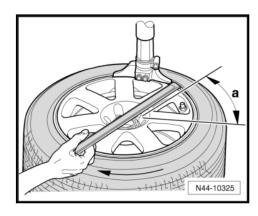
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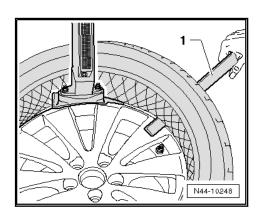
- Check the tire pressure monitoring sensor for loose or damaged parts. If the threaded connections are loose, the union nut, valve insert, seal, sealing washer and valve cap must be replaced with new parts from the repair kit. Refer to ⇒ Electronic Parts Catalog (ETKA)
- Replace the tire pressure monitoring sensor if damaged.

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5.5.2 spect to the cress of the control of the cont tra High Performance Tires

- Only trained personnel can perform the assembly work on run-flat tires and ultra high performance tires.
- If equipped check the tire pressure monitoring sensor with the vehicle diagnostic tester and if necessary replace.

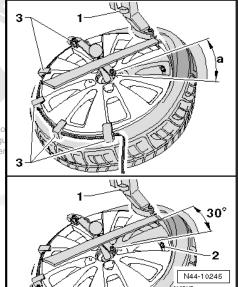




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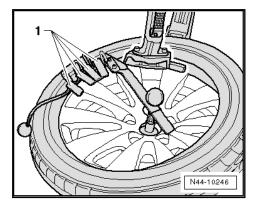
- When cleaning disc wheel (rim), the tire pressure monitoring sensor must not come into contact with water or be blown with pressurized air.
- If equipped handle the glued-on wheel trim carefully. Surface slightly scratched.
- Replace the damaged rim wheel trim.
- Turn the wheel until the tire valve or the tire pressure monitoring sensor is a minimum of 30° before the mounting head.
- Insert the hold-down device -3- aligned with the mounting head -1- on the window edge.
- Pry the upper tire bead with the tire iron over the mounting finger.
- Remove the tire iron.

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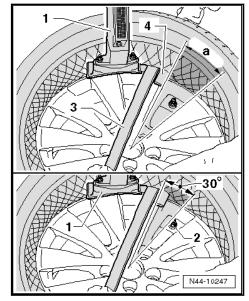


Let tire mounting device run clockwise until upper tire bead lies completely above the rim flange.

This slides the hold-down device -1- against the mounting head. This allows them to be removed again easily.



- Turn the wheel until the tire valve or the tire pressure monitoring sensor is a minimum of 30° before the mounting head.
- Now pry the tire bead over mounting finger of mounting head using tire iron -3-.
- Pry the lower tire bead with the tire iron over the mounting finger.
- Insert the plastic mounting lever -4-.
- Remove the tire iron -3-.

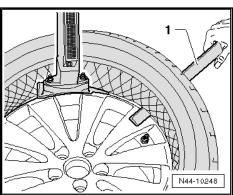


Hold the lower tire bead from the outside above the wheel rim flange with the plastic lever -1-. Let the tire mounting device run clockwise until the tire is completely off the wheel



Note

- Check the tire pressure monitoring sensor for loose or damaged parts. If the threaded connections are loose, the union nut, valve insert, seal, sealing washer and valve cap must be replaced with new parts from the repair kit. Refer to ⇒ Electronic Parts Catalog (ETKA).
- Replace the tire pressure monitoring sensor if damaged.



5.6 Tires, Bringing to Mounting Tempera-



NOTICE

Risk of damage near the tire bead when mounting cold tires.

The center of the tire must meet the minimum mounting temperature of 15 $^{\circ}\text{C}$ to 30 $^{\circ}\text{C}$ (59 $^{\circ}\text{F}$ to 86 $^{\circ}\text{F}$).



(I) NOTICE

Mounting run-flat tires requires a temperature between 21 °C and 30 °C (69.8 °F and 86 °F).

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Warm up cold tires to the minimum mounting temperature of 21 °C (69.8 °F).

Warm the tires in the Heat Cabinet - VAS 6851- if necessary



Note

This also applies to ultra high performance tires (height-/width ratio smaller/same as 45% and speed rating symbol larger than/ same as V).

(!) NOTICE

Mounting run-flat tires requires a temperature between 21 % or in who and 30 °C (69:8:18 Fuand 86:18 F), by AUDI AG. AUDI AG does not guarantee or accept any with respect to the correctness of information in this document. Copyright by AUDI

- For injury-free mounting, the upper sidewall and the upper bead inside must be minimum 21 °C (69.8 °F).
- The internal temperature is called the core temperature.
- Rubber is a poor heat conductor, and for this reason, a cold tire must be within a temperature-controlled environment for a sufficient amount of time until the inner rubber layers have warmed up to at least 21 °C (69.8 °F).
- The tire surface temperature during the warm-up phase is not a measure the inside temperature.
- So that the cold tires warm up as quickly as possible, never stack them one on top of the other; store them separated from each other so that the warm air can "circulate" around them.
- Never use a room heater or a hot air gun to warm up tires because the surface temperature will heat up very quickly to a critical temperature.
- To prevent damage, only warm water or warm air (maximum 50 °C (122 °F)) can be used to warm up a tire!
- If cold tires (below 0 °C (32 °F)) are brought into a warm room (above 0 °C (32 °F)), a layer of ice will start to form on the tires. This layer of ice means that humidity in the warm air is condensing on the tire.
- Once the layer of frost starts to melt, condensation will build up. Wipe up the water with a rag so that the warming up process will not be slowed down by evaporation chill.

Warm-up time:

Warm tires up to at least 21 °C (69.8 °F) in the Heat Cabinet -VAS 6851-.

- Using the example of a room temperature of at least 19 °C (66.2°F) and a tire temperature of 0 °C (32°F) or higher, the tires should be stored for at least two hours at minimum 19 °C (66.2 °F).
- If the room temperature is minimum 19 °C (66.2 °F) and the tire temperature is below 0 °C (32 °F), then the tires should be stored for at least 2.5 hours at a minimum room temperature of 19 °C (66.2 °F).

Recommendations:







Warm tires up to at least 21 °C (69.8 °F) in the Heat Cabinet -VAS 6851-.

- if possible, let the tires stand in the workshop for one day before mounting them
- store the tires as high as possible on an insulated surface, pallet or something similar
- Position the tires so that they can be "surrounded" by the warm air
- Wipe off the sweat
- Never heat the tires with a room heater or a hot air gun!



Mounting run-flat tires requires a temperature between 21 °C and 30 °C (69.8 °F and 86 °F).



5.7 Tires, Mounting

⇒ "5.7.1 Tires, Mounting, Wheels without and with Tire Pressure Monitoring System", page 25

⇒ "5.7.2 Tires, Mounting, Run-Flat Tires and Ultrate High Peright. Copying for private or commercial purposes, in part or in whole, is not formance Tiron", page 37 formance Tires", page 27 with respect to the correctness of information in this document. Copyright by AUDI AG.



The minimum mounting temperature for a tire may not be below 21 °C (69.8 °F) or above 30 °C (86 °F). Refer to ⇒ <u>"5.6 Tires, Bringing to Mounting Temperature", page 23</u>

(I) NOTICE

If tire sealant was used, then the wheel electronics on that particular wheel must be replaced.

5.7.1 Tires, Mounting, Wheels without and with Tire Pressure Monitoring System

- Only trained personnel can perform the assembly work on run-flat tires.
- If equipped check the tire pressure monitoring sensor with the vehicle diagnostic tester and if necessary replace.
- Refer to ⇒ "5.6 Tires, Bringing to Mounting Temperature", <u>page 23</u>



Note

- When cleaning disc wheel (rim), the tire pressure monitoring sensor (if equipped) must not come into contact with water or be blown with compressed air.
- ♦ If equipped handle the glued-on wheel trim carefully. Surface slightly scratched.
- Replace the damaged rim wheel trim.
- Clean the rim.
- Insert the new tire valve with the Valve Fitting Tool VAS 6459- .

- Coat the rim flanges, tire beads and inside of upper tire beads thoroughly with tire mounting paste.
- Place the inner side of the tire on the rim.
- Turn the rim until the tire valve of the tire pressure monitoring sensor aligns with the mounting head.
- Push the tires between the tire valve or the tire pressure monitoring sensor and the mounting head into the bed -direction of arrow-.
- Let the tire dismounting/mounting machine run clockwise until the mounting head is in front of the tire valve or the tire pressure monitoring sensor. Slide the lower tire bead over the rim flange.
- Turn the rim until the tire valve of the tire pressure monitoring sensor aligns with the mounting head.
- Let the tire dismounting/mounting machine run clockwise until the mounting head is in front of the tire valve or the tire pressure monitoring sensor. Slide the upper tire bead over the rim flange.



CAUTION

High spring pressure when filling tire.

Risk of injury from tire/rim fragments.

- Wear protective eyewear.
- Set the spring pressure up to the maximum of 3.3 bar

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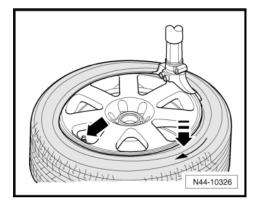
There is a risk of damaging the rim due to too high spring

- Set the spring pressure up to the maximum of 3.3 bar (47.86 psi).
- Inflate the tire to maximum pressure of 3.3 bar (47.86 psi) (spring pressure).
- If tire beads do not make contact completely on disc wheel edge, then release air, press off tire bead once more and coat rim flange thoroughly again with tire mounting paste.
- When the tire bead makes contact on the bead seat, increase the pressure to 4 bar (58.02 psi).
- If the tire bead does not make complete contact with the bead seat, dismount the tire and mount it again.
- Turn the valve insert.
- Fill the tire with the specified tire pressure.
- Balance the tire.



Note

Avoid strong braking or acceleration maneuvers during the first 100 to 200 km (62.1 to 124.3 miles). Otherwise due to the tire mounting paste the tires can distort on the rim.





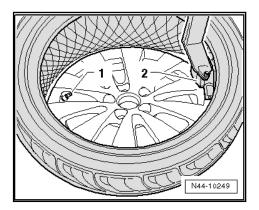
5.7.2 Tires, Mounting, Run-Flat Tires and Ultra High Performance Tires

- Only trained personnel can perform the assembly work on run-flat tires and ultra high performance tires.
- If equipped check the tire pressure monitoring sensor with the vehicle diagnostic tester and if necessary replace.
- Refer to ⇒ "5.6 Tires, Bringing to Mounting Temperature", page 23

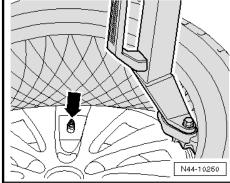


Note

- If equipped handle the glued-on wheel trim carefully. Surface slightly scratched.
- Replace the damaged rim wheel trim.
- Clean the rim.
- Insert the new tire valve with the Valve Fitting Tool VAS 6459-.
- Coat the rim flanges, tire beads and inside of upper tire beads thoroughly with tire mounting paste.
- Place the inner side of the tire on the rim.
- Turn the rim until the tire valve of the tire pressure monitoring sensor aligns with the mounting head.



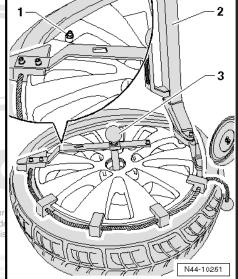
Let the tire dismounting/mounting machine run clockwise until the mounting head is in front of the tire valve or the tire pressure monitoring sensor -arrow-. Slide the lower tire bead over the rim flange.



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- Turn the rim until the tire valve of the tire pressure monitoring sensor -1- aligns with the mounting head -2-.
- Install the hold-down device -3- on the rim.



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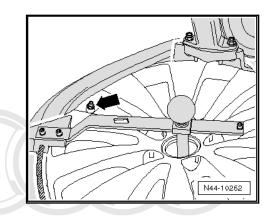
- Let the tire dismounting/mounting machine run clockwise until the mounting head is in front of the tire valve or the tire pressure monitoring sensor. Slide the upper tire bead over the rim flange.
- Remove the hold-down device from the wheel rim flange.



CAUTION

High spring pressure when filling tire. Risk of injury from tire/rim fragments.

- Wear protective eyewear.
- Set the spring pressure up to the maximum of 3.3 bar (47.86 psi).





NOTICE

There is a risk of damaging the rim due to too high spring pressure.

Set the spring pressure up to the maximum of 3.3 bar (47.86 psi).

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- Inflate the tire to maximum pressure of 3.3 bar (47.86 psi) (spring pressure).
- If tire beads do not make contact completely on disc wheel edge, then release air, press off tire bead once more and coat rim flange thoroughly again with tire mounting paste.
- When the tire bead makes contact on the bead seat, increase the pressure to 4 bar (58.02 psi).
- If the tire bead does not make complete contact with the bead seat, dismount the tire and mount it again.
- Turn the valve insert.
- Fill the tire with the specified tire pressure.
- Balance the tire.



Note

Avoid strong braking or acceleration maneuvers during the first 100 to 200 km (62.1 to 124.3 miles). Otherwise due to the tire mounting paste the tires can distort on the rim.

5.8 Tires and Rims, Matching

Hunter RFT33VAG Road Force Touch™ Wheel Balancer - VAS 6230B4- can be inserted as an alternative to matching. Refer to ⇒ "5.11 Hunter RFT33VAG Road Force Touch™ Wheel Balancer VAS 6230B4 ", page 35.



Note

Check the radial run-out and the lateral run-out in the process. Refer to ⇒ "5.9 Tire and Wheel Radial and Lateral Run-Out, Checking", page 30

Refer to ⇒ "5.10 Wheels and Tires, Matching", page 33

If necessary, repair flat spots from standing.

- Refer to ⇒ "5.3 Tires, Dismounting", page 19
- Turn the tire um 180° against the rim.
- Inflate the tire to 4 bar (58.02 psi).
- Tension the wheel with the tire on the balancing machine.
- Check the tire and wheel radial and lateral run-out. Refer to <u>'5.9 Tire and Wheel Radial and Lateral Run-Out, Check-</u> <u>ing", page 30</u>.
- If the radial and lateral run-out are within the specified values, balance the wheel to 0 g (0 oz).
- If the radial and lateral run-out are outside the specified values, match the tire and rim again and rotate the tire 90° relative to the rim.
- Check the tire and wheel radial and lateral run-out again. Refer to ⇒ "5.9 Tire and Wheel Radial and Lateral Run-Out Checking", page 30
- If the radial and lateral run-out are within the specified values, balance the wheel to 0 g (0 oz).
- If the radial and lateral run-out are outside the specified values, match the tire and rim again and rotate the tire 180° relative to the rim.

Protected by copyright. Copying for private or commercial purposes, in part or in whole, is not Check the tire and wheel radial and lateral run-out againss authorised by AUDI AG. AUDI AG does not guarantee or accept any liability Refer to \$\(\phi\) "5.9 Tire and Wheel Radial and Lateral" Run-Out, the correctness of information in this document. Copyright by AUDI AG. Checking", page 30 .

- If the radial and lateral run-out are within the specified values, balance the wheel to 0 g (0 oz).
- If the radial and lateral run-out are still outside the specified values check the rim for radial and lateral run-out.
- In the radial and lateral run-out of the rim is within the specified values, replace the tire.

5.9 Tire and Wheel Radial and Lateral Run-Out, Checking

⇒ "5.9.1 Tire and Wheel Radial and Lateral Run-Out, Checking, Tolerances", page 30

⇒ "5.9.2 Wheels and Tires, Radial and Lateral Run Out, Checking with Tire Dial Gauge", page 31

⇒ "5.9.3 Radial and Lateral Run-Out on Wheel/Tire, Checking with Wheel Centering System Adapter VAS 5271", page 32

5.9.1 Tire and Wheel Radial and Lateral Run-Out, Checking, Tolerances

Radial and lateral run-out occur when the wheel and tire are not running precisely true.

For technical reasons, 100% true running is not possible.

Therefore the manufacturers of these components allow a precisely specified tolerance.

Mounting the tire in a unfavorable position on the wheel can be the cause for exceeding the maximum allowed tolerance for wheel with tire.

The table shows the maximum permissible tolerance values for the wheel with mounted tire.





Tolerances for radial and lateral run-out of rim with tire

Rim with tire	Radial run-out (mm)	Lateral run-out (mm)
Passenger Vehicle	0.9	1.1 (1.3 near the lettering)

Wheels and Tires, Radial and Later-5.9.2 al Run Out, Checking with Tire Dial Gauge

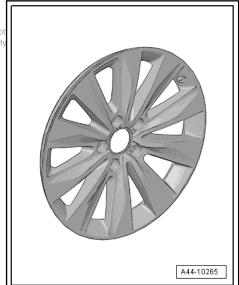


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- Be careful not to scratch off the bonded wheel trim on these AG.
- The surface of the wheel trim is very sensitive.
- The rim will have to be replaced if the wheel trim is damaged.
- The wheel trim cannot be replaced.

Checking lateral run-out

- Preload the Tire Pressure Gauge approximately 2 mm.



- Position the Tire Pressure Gauge on the side wall of the tire.
- Rotate the wheel slowly.
- Note the smallest and the largest dial readings.



Note

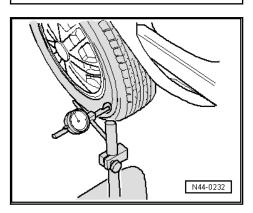
If the difference is greater than 1.3 mm, the lateral run-out is too

In this case, lateral run-out can be reduced by matched mounting of the tire. Refer to <u>⇒ "5.10 Wheels and Tires, Matching"</u>,

Peak values on the Tire Pressure Gauge due to small irregularities in the rubber may be disregarded.

Checking radial run-out

- Preload the Tire Pressure Gauge approximately 2 mm.



- Position the Tire Pressure Gauge on the tire tread.
- Rotate the wheel slowly.
- Note the smallest and the largest dial readings.

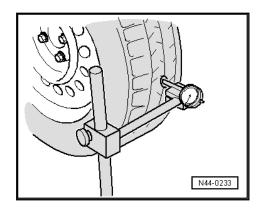


Note

If the difference is greater than 1 mm, the radial run-out is too great.

In this case, radial run-out can be reduced by matched mounting of the tire. Refer to ⇒ "5.10 Wheels and Tires, Matching", page 33

Hunter RFT33VAG Road Force Touch™ Wheel Balancer - VAS 6230B4- can be inserted as an alternative to matching. Refer to ⇒ "5.11 Hunter RFT33VAG Road Force Touch™ Wheel Balancer VAS 6230B4 ", page 35.



5.9.3 Radial and Lateral Run-Out on Wheel/ Tire, Checking with Wheel Centering System Adapter - VAS 5271-

Be careful not to scratch off the bonded wheel trim on these

The surface of the wheel trim is very sensitive.

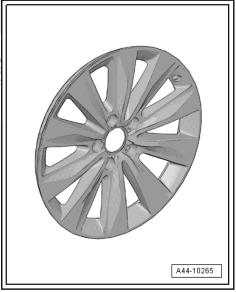
The rim will have to be replaced if the wheel trim is damaged.

The wheel trim cannot be replaced.

Checking lateral run-out

Preload the Tire Pressure Gauge approximately 2 mm.

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- Position the Tire Pressure Gauge on the side wall of the tire.
- Rotate the wheel slowly.
- Note the smallest and the largest dial readings.



Note

If the difference is greater than 1.3 mm, the lateral run-out is too great.

In this case, lateral run-out can be reduced by matched mounting of the tire. Refer to ⇒ "5.10 Wheels and Tires, Matching", page 33

Peak values on the Tire Pressure Gauge due to small irregularities in the rubber may be disregarded.

Checking radial run-out

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- Preload the Tire Pressure Gauge approximately 2 mm.
- Position the Tire Pressure Gauge on the tire tread.
- Rotate the wheel slowly.
- Note the smallest and the largest dial readings.



Note

If the difference is greater than 1 mm, the radial run-out is too

In this case, radial run-out can be reduced by matched mounting of the tire. Refer to <u>⇒ "5.10 Wheels and Tires, Matching",</u> <u>page 33</u>

5.10 Wheels and Tires, Matching

Hunter RFT33VAG Road Force Touch™ Wheel Balancer - VAS 6230B4- can be inserted as an alternative to matching. Refer to ⇒ "5.11 Hunter RFT33VAG Road Force Touch™ Wheel Balancer VAS 6230B4 ", page 35 .

General Information

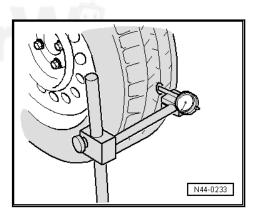
If radial or lateral run-out from rim or tire meet each other, the untrue running of the wheel and tire is increased.

For technical reasons, 100% true running is not possible.

Drive the tires until they are warm before matching them to the tires already on the vehicle. This eliminates any existing flat spots from standing.

Work procedure for match-mounting

- Let the air out of the tire.
- Remove the tire bead from the wheel rim flange.
- Coat the tire bead all the way around with Tire Mounting Paste .
- Turn the tire um 180° against the rim.
- Inflate the tire to approximately 4 bar (58.02 psi).
- Tension the wheel with the tire on the balancing machine.





Check the run-out or the radial and lateral run-out, as necessary.



Note

- If the radial and lateral run-out value is not exceeded, the wheel can be balanced to 0 grams. Specifications are found
- If the radial and lateral run-out lies outside the specified values, the tire must be turned again.
- Let the air out and remove the tire beads from the wheel rim flanges.
- Rotate the tire 90° (one guarter of a turn) relative to the rim.
- Inflate the tire to 4 bar (58.02 psi) again and check the run-out.



Note

- If the radial and lateral run-out value is not exceeded, the wheel can be balanced to 0 grams.
- If the radial and lateral run-out is still outside the specified values, the wheel must be turned again.
- Press the tire beads off the rim flanges.
- Rotate the tire 180° (half a turn) relative to the rim.

If the values for radial or lateral run-out are still outside the specified values, check the rim for radial and lateral run-out.

If the measured values for radial and lateral run-out of the rim are within the specified values, then the tire has excessive radial or lateral run-out. In this case, the tire must be replaced.



Note

- Assembly paste from mounting tires is located between tires and rim flanges.
- Avoid strong braking or acceleration maneuvers during the first 100 to 200 km (62.1 to 124.3 miles). Otherwise the tires can turn on the rim. Then the work would then be undone.

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5.11 **Hunter RFT33VAG Road Force** Touch™ Wheel Balancer - VAS 6230B4-

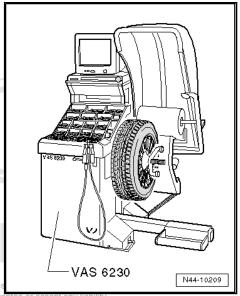
Expanded functions can be performed using Hunter RFT33VAG Road Force Touch™ Wheel Balancer - VAS 6230 B4- in addition to the previously known balancers.

A special characteristic of this system is testing the radial force of wheel/tire during rolling.

For this purpose, a roller presses a force of approximately 635 kg (1,399.93 lbs) against the wheel. This simulates the tire contact force against the road surface while driving.

Tire contact forces fluctuate due to radial and lateral run-out and differing stiffness in the tires.

The -VAS 6230 B4- detects and stores the position of the maximum measured radial force in the tires. After that, the position of smallest dimension between rim flange and disc wheel center is measured.



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5.12 Wheel, Balancing

⇒ "5.12.1 Conditions", page 35

⇒ "5.12.2 Wheel, Balancing on Stationary Balancing Machine", <u>page 35</u>

⇒ "5.12.3 Wheel, Balancing with Fine Balancing Machine (Finish Balancer)", page 38

<u>"5.12.4 Rim Radial and Lateral Run-Out, Checking", page</u>

5.12.1 Conditions

Before beginning balancing, the following requirements must be fulfilled.

- The tire pressure must be OK.
- The tire tread must not be worn down on one side and should be at least 4 mm deep.
- The tires must not have any damage such as cuts, holes, foreign bodies, etc.
- The suspension and steering, including the shock absorber, must be in perfect condition.
- Tires may not have any flat spots from standing.

A flat spot from standing cannot be balanced.

5.12.2 Wheel, Balancing on Stationary Balancing Machine

Pay attention to the conditions. Refer to ⇒ "5.12.1 Conditions", page 35

Tension the wheel on balancing machine

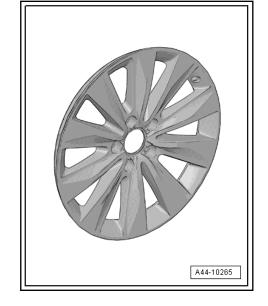


Note

- Be careful not to scratch off the bonded wheel trim on these
- The surface of the wheel trim is very sensitive.
- The rim will have to be replaced if the wheel trim is dam-
- The wheel trim cannot be replaced.

Dirt and rust in the area of the contact surfaces and centering of the wheel distort the result.

Clean the contact surfaces, centering seat and wheel disc using the Pneumatic Brush Grinder Set - VAS 6446- before tensioning wheel on balancing machine! Refer to ⇒ Workshop Equipment, Catalog.

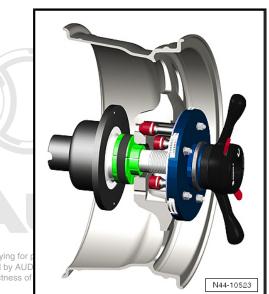




Note

The wheel balancing machine must use the correct system for centering and tensioning the tires when replacing them. Reference the information for the Wheel Balancing Machine Centering System before beginning any work. Refer to ⇒ Workshop Equipment, Catalog .

Tension the wheel with the tire on the balancing machine.









Note

- To mount the wheel on the wheel balancer, use for example Wheel Centering System Adapter - VAS 5271-.
- This way a 100% centering of the wheel and gentle tensioning is possible!
- It is not possible to center it 100% on balancing machine with conical tensioners.
- With a deviation of 0.1 mm outside the center, there is an imbalance of 10 grams on the wheel/tire.

Wheel/tire balancing procedure

- Let the wheel/tire turn on the balancing machine.
- Check the run of the characteristic curves on the sidewall of the tire in the area of the rim flange.
- Check the tire wear pattern while the wheel/tire is turning.



Note

In the event of one-sided wear, wear spots from braking or severe flattening, smooth running cannot be achieved by balancing. In this case, the tire must be replaced.

- Check the run-out on the wheel/tire. If the wheel with tire runs untrue, although there are no flat spots, a radial run-out or lateral run-out may be the cause.
- Check the wheel with tire for radial and lateral run-out. Refer to ⇒ "5.9 Tire and Wheel Radial and Lateral Run-Out, Checking", page 30.
- If the radial and lateral run-out are within the specified tolerance, balance the wheel and tire.



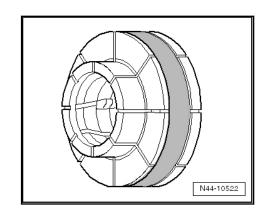
Note

- Do not use more than 60 grams of weight per wheel in whole, is not
- If more weight is necessary, a smoother running can ach to ieved by matched mounting of the tire. Matching a tire. Refer to ⇒ "5.8 Tires and Rims, Matching", page 29.
- The display in the balancing machine should show 0 grams.
- Hunter RFT33VAG Road Force Touch™ Wheel Balancer -VAS 6230B4- can be inserted as an alternative to matching. Refer to ⇒ "5.11 Hunter RFT33VAG Road Force Touch™ Wheel Balancer VAS 6230B4 ", page 35.
- Install the wheel on the vehicle.



Ceramic brake destruction due to removal/installation of the wheel.

To remove/mount a wheel, install the long drift instead of the wheel bolts at the topmost position (12 o'clock position) and insert the short drift in the wheel bolt mounts for support.



- Tighten the lowest wheel bolt by hand to approximately 30 Nm.
- Tighten the remaining wheel bolts diagonally to approximately 30 Nm. This process centers the wheel on the wheel
- Set the vehicle on its wheels.
- Use a torque wrench to tighten the wheel bolts diagonally to the specified tightening specification.
- Perform a road test.

If a vibration is still detected during the road test, the cause may be due to tolerance in the wheel centering.

The component tolerances of wheels and wheel hubs can be additive in unfavorable cases. Vibration can result from this. This can be eliminated using a fine balancing machine.

Refer to ⇒ "5.12.3 Wheel, Balancing with Fine Balancing Machine (Finish Balancer)", page 38

5.12.3 Wheel, Balancing with Fine Balancing Machine (Finish Balancer)

Pay attention to the conditions. Refer to ⇒ "5.12.1 Conditions", page 35

Tension the wheel on balancing machine

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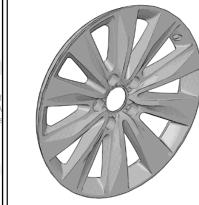
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Note

- Be careful not to scratch off the bonded wheel trim on these rims.
- The surface of the wheel trim is very sensitive.
- The rim will have to be replaced if the wheel trim is damaged.
- The wheel trim cannot be replaced.

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Note

- Working with a Fine Balancing Machine requires instruction from the manufacturer of the balancer.
- When balancing, place the wheels of the driven axle on the turntable sensors. On a FWD vehicle, the front wheels must be on the sensors. On AWD vehicles, all four wheels must be on the sensors.

If it is determined when balancing on the vehicle the residual imbalance is more than 20 grams, the wheel should be rotated on the wheel hub.

- Mark the point at which the imbalance is indicated.
- Afterwards, unbolt the wheel and rotate its position on the wheel hub so that the marked positions point downward.



Note

The wheel hub must not turn during this procedure.

- First, tighten the lowest wheel bolt hand-tight to approximately 30 Nm.
- Tighten the remaining wheel bolts diagonally to approximately 30 Nm. This process centers the wheel properly on the wheel hub.
- Check again whether the imbalance is less than 20 grams using the fine balancing machine.



Note

The imbalance should not be smaller than 20 grams under any circumstances before changing balance weight.

- Loosen the wheel bolts again, if necessary.
- Rotate the wheel relative to the wheel hub once more by one or two wheel bolt holes.
- Tighten the wheels according to the method described above.



Note

Only if the imbalance is less than 20 grams should the imbalance be reduced by changing the balance weight.

- Balance the wheels until the imbalance is below 5 grams.
- Tighten the wheel bolts to the specified tightening specification if not already done.

Always tighten the wheel bolt to the tightening specification and using the torque wrench.

5.12.4 Rim Radial and Lateral Run-Out, Checking

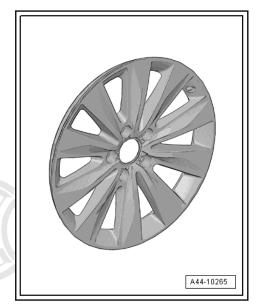
Mount the rim on the Balancing Machine .

Tension the wheel on balancing machine



Note

- Be careful not to scratch off the bonded wheel trim on these
- The surface of the wheel trim is very sensitive.
- The rim will have to be replaced if the wheel trim is damaged.
- The wheel trim cannot be replaced.
- Use the Wheel Centering System Adapter VAS 5271-
- Preload the Tire Pressure Gauge approximately 2 mm.
- Turn the rim slowly.

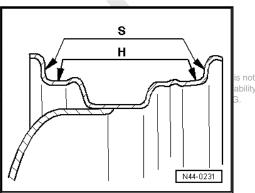


- Note the smallest and the largest dial readings.
- S Lateral Run-Out
- H Radial Run-Out
- Compare the determined value with the specifications in the right. Co table. Refer to <u>⇒ page 40</u>. with respect to the corr



Note

Peak values on the Tire Dial Gauge due to small irregularities may be disregarded.



Specified values for radial and lateral run-out on the rim

Rim	Radial run-out (mm)	Lateral run-out (mm)
Steel wheel	0.5	0.5
Light alloy wheel	0.5	0.8



Note

If the measured value exceeds the specified value, no acceptable smooth running can be attained.

6 Tire Pressure Monitoring System

- ⇒ "6.1 System Description Tire Pressure Monitoring System", page 41
- ⇒ "6.2 Overview Tire Pressure Monitoring Sensor", page 43
- ⇒ "6.3 Tire Pressure Monitoring Sensor, Removing and Installing", page 49
- ⇒ "6.4 Metal Valve, Removing and Installing", page 53
- 6.1 System Description - Tire Pressure Monitoring System
- ⇒ "6.1.1 Indirect Measuring System, RKA (Tire Pressure Monitoring System)", page 41
- ⇒ "6.1.2 Indirect Measuring System, TPMS Plus (Tire Pressure Monitoring System Plus)", page 42
- ⇒ "6.1.3 Direct Measuring System, RDK (Tire Pressure Monitoring System with Tire Pressure Monitoring Sensor)", page 43

6.1.1 permittindirect Measuring System, RKA (Tire any liability with Indirect Measuring System). Pressure Monitoring System)

TPMS indirect measuring. There are no wheel electronics installed inside the wheel. With the help of the ABS sensors, the TPMS compares the tire tread circumference of the individual wheels.

The system must be reprogrammed after every wheel mounting, regardless of whether it is at the same position or it is for a different wheel.

These statements refer to legal requirements in the European Union. No claims are made as to their completeness.

General Information

The tire pressure monitoring system is included in the software in the ABS Control Module - J104- . The system will recognize a slow and gradual decrease in tire pressure on a wheel. The DTC memory entries for tire pressure monitoring system are stored in the ABS Control Module - J104- . With the help of the ABS speed sensor, the TPMS compares the speed and rolling circumference of the individuals tires.

After the following work and/or changes and with the ignition switched on, the Tire Pressure Monitoring Display Button -E492- must be pressed until the confirmation chime sounds:

- Change in the tire pressures
- A change in one or more tires
- Changing a tire, for example, from front to rear
- Removing or installing one or multiple tires

If a tire has changed in circumference, the Tire Pressure Monitoring Display Indicator Lamp - K220- in the instrument cluster will turn on. Rolling circumference of a tire may change due to:

- Insufficient tire pressure
- Structural damage on tires
- Vehicle is loaded heavily on one side
- High load on one axle, when towing trailer for example
- When snow chains are used

Wheel and Tire Guide General Information - Edition 01.2024

- Spare wheel is mounted
- One wheel is replaced



Note

Depending on the vehicle the basic setting is performed in different ways.

Make sure to pay attention to the vehicle owner's manual

6.1.2 Indirect Measuring System, TPMS Plus (Tire Pressure Monitoring System Plus)

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TPMS + indirect measuring. There are no wheel electronics so of information in this document. Copyright by AUDI AG. installed inside the wheel. With the help of the ABS sensors, the TPMS compares the tire tread circumference and vibration behavior of the individuals wheels. The loss of pressure is determined indirectly. If there is a change in the tire pressure, then the speed "and the vibration behavior" of respective wheel will also change.

The system must be reprogrammed after every wheel mounting, regardless of whether it is at the same position or it is for a different wheel.

These statements refer to legal requirements in the European Union. No claims are made as to their completeness.

General Information

The tire pressure monitoring system is included in the software in the ABS Control Module - J104- . The system will recognize a slow and gradual decrease in tire pressure on a wheel. The DTC memory entries for tire pressure monitoring system are stored in the ABS Control Module - J104-. With the help of the ABS speed sensor, the TPMS compares the speed and rolling circumference of the individuals tires.

After the following work and/or changes and with the ignition switched on, the Tire Pressure Monitoring Display Button -E492- must be pressed until the confirmation chime sounds:

- Change in the tire pressures
- A change in one or more tires
- Changing a tire, for example, from front to rear
- Removing or installing one or multiple tires

If a tire has changed in circumference, the Tire Pressure Monitoring Display Indicator Lamp - K220- in the instrument cluster will turn on. Rolling circumference of a tire may change due to:

- Insufficient tire pressure
- Structural damage on tires
- Vehicle is loaded heavily on one side
- High load on one axle, when towing trailer for example
- When snow chains are used
- Spare wheel is mounted
- One wheel is replaced





Note

Depending on the vehicle the basic setting is performed in different ways.

Make sure to pay attention to the vehicle owner's manual

6.1.3 Direct Measuring System, RDK (Tire **Pressure Monitoring System with Tire** Pressure Monitoring Sensor)

TPMS direct measuring. The wheel electronics are installed inside the wheel on the metal valve; the tire pressure and temperature values are transmitted and evaluated periodically.

The system must be reprogrammed after every wheel mounting, regardless of whether it is at the same position or it is for a different wheel.

These statements refer to legal requirements in the European Union. No claims are made as to their completeness.

- Change in the tire pressures
- A change in one or more tires
- Changing a tire, for example, from front to rear
- Removing or installing one or multiple tires
- Spare wheel is mounted
- one wheel is replaced



Note

Depending on the vehicle the basic setting is performed in different ways.

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6.2 Overview - Tire Pressure Monitoring Sensor

⇒ "6.2.1 Overview - Tire Pressure Monitoring Sensor, Version

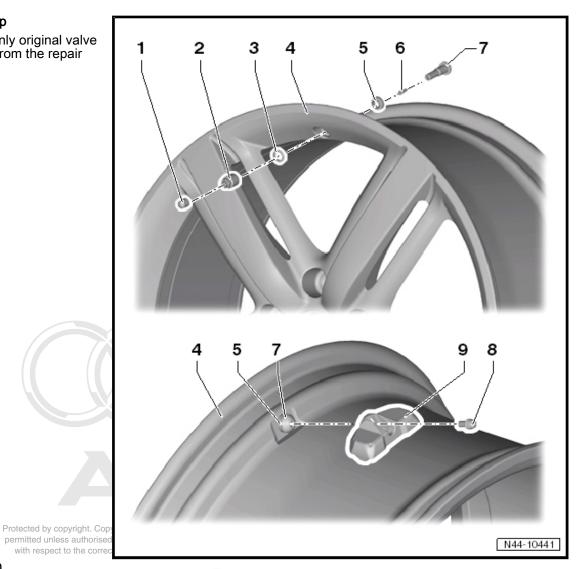
<u>"6.2.2 Overview - Tire Pressure Monitoring Sensor, Version</u>

⇒ "6.2.3 Overview - Tire Pressure Monitoring Sensor, Version 3", page 47

6.2.1 Overview - Tire Pressure Monitoring Sensor, Version 1

1 - Valve Cap

Use only original valve caps from the repair set.





Note

Do not screw any aluminum valve caps onto steel valve bodies. Aluminum caps attach to the steel valve body into a inseparable connection and cannot be separated again.

2 - Union Nut

- ☐ Individual component of ⇒ Item 7 (page 45)
- □ Always replace if removed
- ☐ The tightening specification of the union nut is printed on the sensor
- □ 4 Nm

3 - Washer

☐ Individual component of ⇒ Item 7 (page 45)

4 - Disc Wheel

5 - Seal

☐ Individual component of ⇒ Item 7 (page 45)

6 - Valve Insert



u	Replace at every tire change
	Note
	Do not use brass valve inserts, but only use nickel-plated (silver) valve inserts (corrosion risk).
7 - M	etal Valve
	Supplied as a replacement part with bolt <u>⇒ Item 8 (page 45)</u>
	Removing and Installing. Refer to \Rightarrow "6.4.1 Metal Valve, Removing and Installing, Version 1", page 53.
8 - B	olt
	Individual component of ⇒ Item 7 (page 45) Microencapsulated Replace 4 Nm
9 - Ti	re Pressure Monitoring Sensor
	The battery is a component of the tire pressure monitoring sensor and cannot be replaced separately After using a wheel repair kit, the bore for the valve and opening of the pressure sensor must be wiped clean.
	Removing and Installing: Refer to pri6.3.1 Time Pressure Sensor Removing and Installing, Version 1", page 49. permitted unless authorised by AUDI AG. AUDI AG does not guarantee or accept any liability with respect to the correctness of information in this document. Copyright by AUDI AG.

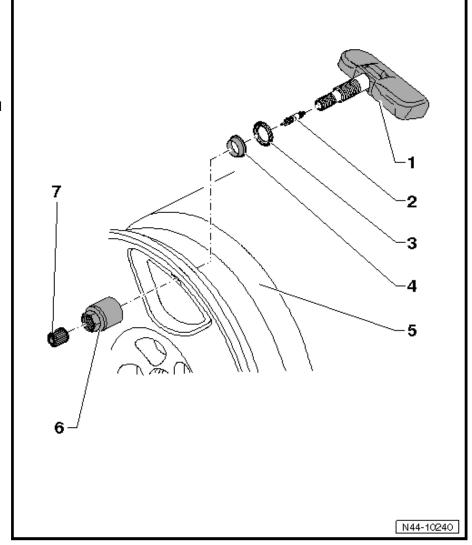
Overview - Tire Pressure Monitoring Sensor, Version 2 6.2.2

1 - Tire Pressure Monitoring Sensor

- Is replaced with the valve
- ☐ The battery is a component of the tire pressure monitoring sensor and cannot be replaced separately
- After using a wheel repair kit, the bore for the valve and opening of the pressure sensor must be wiped clean.
- Removing and Installing. Refer to ⇒ <u>6.3.2 Tire Pressure</u> Sensor, Removing and Installing, Version 2", page 49

2 - Valve Insert

☐ Replace at every tire change





Note

Do not use brass valve inserts, but only use nickel-plated (silver) valve inserts (corrosion risk).

3 - Sealing Washer

- Is slightly deformed when tightening the union nut ⇒ Item 6 (page 46)
- 4 Seal
- 5 Disc Wheel
- 6 Union Nut
 - ☐ The tightening specification of the union nut is printed on the sensor
 - 8 Nm.
- 7 Valve Capyright. Copying for private or commercial purposes, in part or in whole, is not printuseronly briginal valve caps from the repair setcept any liability with respect to the correctness of information in this document. Copyright by AUDI AG.



Note

Do not screw any aluminum valve caps onto steel valve bodies. Aluminum caps attach to the steel valve body into a inseparable con-



nection and cannot be separated again.

6.2.3 Overview - Tire Pressure Monitoring Sensor, Version 3



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Wheel and Tire Guide General Information - Edition 01.2024

1 - Tire Pressure Monitoring Sensor

- Is delivered as a replacement part with the metal valve
- The battery is a component of the tire pressure monitoring sensor and cannot be replaced separately
- After using a wheel repair kit, the bore for the valve and opening of the pressure sensor must be wiped clean.
- Removing and Installing. Refer to ⇒ 6.3.3 Tire Pressure Sensor, Removing and Installing, Version 3", page 51

2 - Bolt

- □ Flat head square head screw
- Is delivered as a replacement part with the metal valve

3 - Metal Valve

☐ Is delivered as a replacement part with the square head screw

4 - Valve Insert

□ Replace at every tire change



Note

Do not use brass valve inserts, but only use nickel-plated (silver) valve inserts (corrosion risk).

5 - Disc Wheel

6 - Union Nut

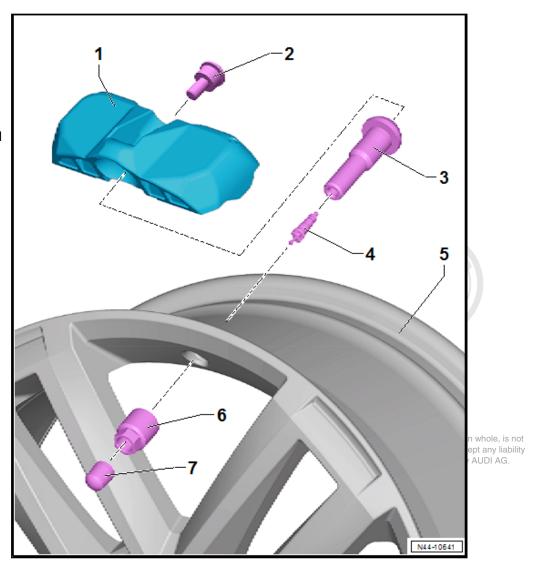
- ☐ Is delivered as a replacement part with the metal valve
- ☐ Has a shear part
- □ Always replace if removed
- ☐ The tightening specification of the union nut is printed on the sensor
- ☐ 4 Nm (tire pressure monitoring sensor to index E)
- ☐ 6 Nm (tire pressure monitoring sensor from index F)
- ☐ do not counterhold on the metal valve when tightening

☐ Use only original valve caps from the repair set.



Note

Do not screw any aluminum valve caps onto steel valve bodies. Alu-





minum caps attach to the steel valve body into a inseparable connection and cannot be separated again.

6.3 Tire Pressure Monitoring Sensor, Removing and Installing

⇒ "6.3.1 Tire Pressure Sensor, Removing and Installing, Version 1", page 49

⇒ "6.3.2 Tire Pressure Sensor, Removing and Installing, Version 2", page 49

⇒ "6.3.3 Tire Pressure Sensor, Removing and Installing, Version 3", page 51

6.3.1 Tire Pressure Sensor, Removing and Installing, Version 1

Special tools and workshop equipment required

♦ Torque Wrench - V.A.G 1410-

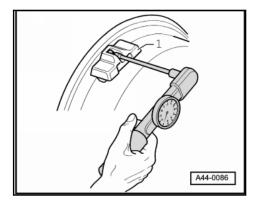


Removing

- Dismount the tire from the rim. Refer to ⇒ "5 Tires, Mounting", page 19.
- Remove the bex socket bolt and the tire pressure monitoring is not **Sensor**itted unless authorised by AUDI AG. AUDI AG does not guarantee or accept any liability with respect to the correctness of information in this document. Copyright by AUDI AG.

Installing

- Press the tire pressure monitoring sensor -1- to the rim and install at the valve to tightening specification.
- Visually inspect and make sure there is a secure fit. The Tire Pressure Monitoring Sensor must not have any play when installed and the supports must rest in the well.



6.3.2 Tire Pressure Sensor, Removing and Installing, Version 2

Special tools and workshop equipment required

Torque Wrench - V.A.G 1410-

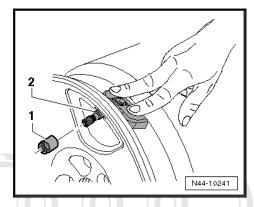


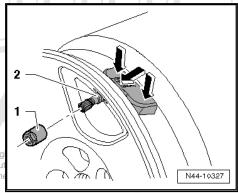
Removing

- Dismount the tire from the rim. Refer to ⇒ "5 Tires, Mounting", page 19
- Remove the union nut -1-.
- Remove the Tire Pressure Monitoring Sensor -2- from the rim well.

Installing

- Clean the valve hole.
- Install the Tire Pressure Monitoring Sensor -2- with the new seal and sealing washer.
- Press the Tire Pressure Monitoring Sensor -2- on the spots marked with the -arrows- into the disc wheel (rim).
- Install the union nut -1- hand-tight on the tire pressure monitoring sensor from the outside.





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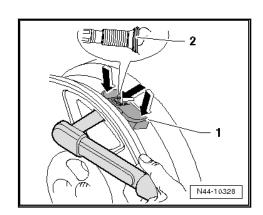


Install the Tire Pressure Monitoring Sensor -1- at the marked positions -arrows- in the rim well and tighten the union nut to the tightening specification.



Note

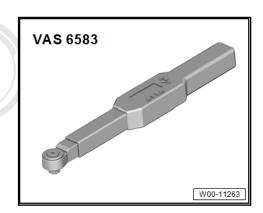
- Sealing washer -2- becomes slightly deformed when doing
- The sealing washer can be installed one time only. At every installation, replace the sealing washer and rubber seal with new parts.
- Do not tighten the union nut again. This will damage the seal and it will leak.
- Visually inspect and make sure there is a secure fit. The Tire Pressure Monitoring Sensor must not have any play when installed and the supports must rest in the well.



6.3.3 Tire Pressure Sensor, Removing and Installing, Version 3

Special tools and workshop equipment required

♦ Electronic Torque Wrench 3-60Nm - VAS 6583-



Removing

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- Dismount the tire from the rim. Refer to ⇒ 5 Tires, Mounting", page 19.
- Remove the union nut -1- with the metal valve.



Note

The metal valve turns when the nut is turned -1-.

Remove the tire pressure monitoring sensor -2- from the rim.

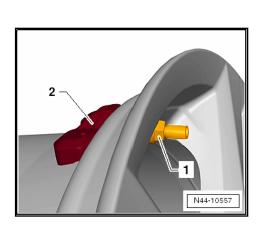


Note

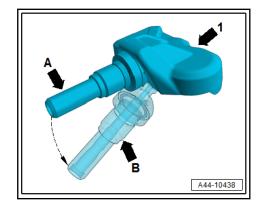
- If the metal valve is still on the sensor, pay attention that the sensor does not get damaged when removing it.
- Do not grasp the sensor with pliers or similar tools.



Clean the valve hole.



Turn the metal valve at the sensor -1- downward -arrow A to arrow B-.

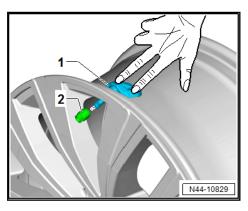


Insert the tire pressure monitoring sensor with the metal valve -1- from the inside into the valve hole and tighten the union nut -2- three turns.

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- Install the union nut approximately three turns onto the Tire Pressure Monitoring Sensor from the outside.
- Using light pressure, push the Tire Pressure Monitoring Sensor -1- into the rim well, so that the sensor feet are seated.



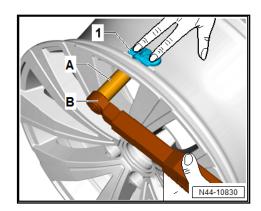


Tighten the union nut to the Metal Valve -1- to tightening specification.



Note

- When installing, a bar breaks inside the union nut (audible cracking), which causes the tightening specification to decrease short term.
- Continue to tighten the union nut to the tightening specification after feeling the bar break.
- Visually inspect and make sure there is a secure fit. The Tire Pressure Monitoring Sensor must not have any play when installed and the supports must rest in the well.





Damage to sensor due to incorrect assembly.

- After the sensor has been tightened to the tightening specification, it must not be tightened further.
- Install the valve cap on the valve.
- Install the tire on the rim.

6.4 Metal Valve, Removing and Installing

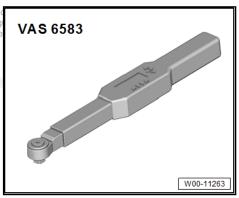
6.4.1 Metal Valve, Removing and Installing, Version 1", page

⇒ "6.4.2 Metal Valve, Removing and Installing, Version 3", page 54

6.4.1 Metal Valve, Removing and Installing, Version 1

Special tools and workshop equipment required

♦ Electronic Torque Wrench 3 = 60Nmp: //WAS 06583 = private or commercial purp permitted unless authorised by AUDI AG. AUDI AG does not give with respect to the correctness of information in this document.



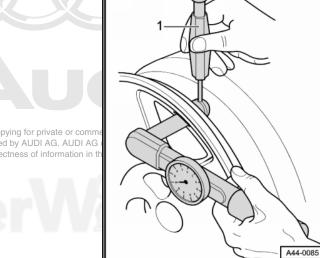
Removing

- Remove the tire pressure monitoring sensor.
- Remove the union nut and the metal valve from the disc wheel.

Installing

- Clean the valve hole.
- Insert the metal valve into the valve hole, attach the washer and tighten the union nut to tightening specification.

- Secure the valve using the 2 mm pin against turning.
- Install the tire pressure monitoring sensor.

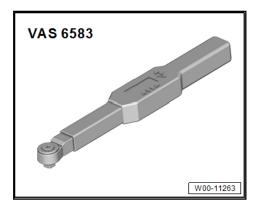


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6.4.2 Metal Valve, Removing and Installing, Version 3

Special tools and workshop equipment required

◆ Electronic Torque Wrench 3-60Nm - VAS 6583-



Removing

- Remove the tire pressure monitoring sensor.

Installing



Note

- If the metal valve is still on the sensor, pay attention that the sensor does not get damaged when removing it.
- Do not grasp the sensor with pliers or similar tools.
- All parts from the repair kit must be used.
- Insert the square head screw into the sensor and install the metal valve loosely.
- Install the tire pressure monitoring sensor.

Wheel Bolts 7

- ⇒ "7.1 Wheel Bolts, Tightening Correctly", page 55
- ⇒ "7.2 Wheel Bolt Tightening Specifications", page 56
- ⇒ "7.3 Wheel Bolt Versions", page 58
- ⇒ "7.4 Anti-Theft Wheel Bolt", page 60
- ⇒ "7.5 Master Sets for Anti-Theft Wheel Bolts", page 60

7.1 Wheel Bolts, Tightening Correctly



To ensure the secure fit of the wheel bolts:

The ball bearing surfaces of the wheel bolts must be free of grease and clean.

The ball bearing surfaces of the wheel bolts must "not be greased or oiled".

Use the correct wheel bolts.

Depending on the model, the wheel bolts have different lengths and different ball bearing surfaces. Refer to the ⇒ Electronic Parts Catalog (ETKA) .

Tighten all-wheel bolts to the right tightening specification. Refer to ⇒ "7.2 Wheel Bolt Tightening Specifications", page

Pay attention to the following information:

To install-wheel bolts correctly, follow the sequence and instructions below.



Note

Do "not" use an impact wrench to install the wheel bolts.

- Before mounting a wheel, carefully clean all rim contact surfaces for the wheel hub, the wheel hub and the surfaces for the wheel bolts on the rim.
- Before installing the wheel bolts, carefully clean the thread and the spherical cap contact surfaces.
- Protected by copyright. Copying for private or commercial purposes, in part or in whole, is not Apply the Optimol paste to the threads on the wheel mbolts authorised by AUDI AG. AUDI AG does not guarantee or accept any liability with respect to the correctness of information in this document. Copyright by AUDI AG. Refer to the ⇒ Electronic Parts Catalog (ETKA).
- The ball bearing surfaces of the wheel bolts must be free of grease and clean.
- Do "not" use an impact screwdriver or impact wrench to insert the wheel bolts.
- Install all-wheel bolts in a diagonal sequence until the wheel is seated securely on the wheel hub. Only then can the vehicle be placed on the ground.
- Place the vehicle on the ground.
- Use a wrench that is the correct size for the vehicle when tightening the wheel bolts to the specification.
- Set the required tightening specification on the torque wrench.



- Tighten all-wheel bolts in a diagonal sequence to the tightening specification when the vehicle is stationary on the ground.
- Check each wheel bolt with the torque wrench set to the correct tightening specification at least once.
- By checking the torque, make sure "all" wheel bolts on "all" wheels are tightened to the required specification.

Note

- After achieving and checking the correct torque on "all-wheel" bolts", install the caps completely and securely on all-wheel
- Use the back of a screwdriver or a suitable tool to do this. Do not damage the cap.

7.2 Wheel Bolt Tightening Specifications



The wheel bolts are different lengths and have ball bearing surfaces depending on the model.

The wheel bolts and wheels will only be secured correctly if the correct wheel bolts are used.

Make sure the correct wheel bolts are installed. Refer to ⇒ Electronic Parts Catalog (ETKA) .

The ball bearing surfaces of the wheel bolts must be free of grease and clean.

The ball bearing surfaces of the wheel bolts must "not be greased or oiled".

Audi A1

Protected by copyright Co Model titled unless authoris	poying for private or commercial purposes, in pared by Fightening Specification tee	art or in whole, is not or accept any liability ght by AUDI AG.
A1, S1, A1 quattro, Type 8X	120 Nm	gitt by AODI AG.
A1, Type GB	120 Nm	

Audi A2

Model	Tightening Specification
A2, type 8Z	120 Nm

Audi A3

Model	Tightening Specification
A3, Type 8L	120 Nm
A3, Type 8P	120 Nm
A3, Type 8V	120 Nm
A3, Type 8Y	140 Nm
RS3, Type 8Y	120 Nm

Audi A4

Model	Tightening Specification
RS 4, Type 8D	140 Nm
A4, all types	120 Nm

Audi A5

Model	Tightening Specification
A5, all types	120 Nm

Audi A6, Audi A7

Model	Tightening Specification
A6, all types	120 Nm
A7, all types	120 Nm

Audi A8

Model	Tightening Specification
A8, all types	120 Nm

Audi TT

Model	Tightening Specification	
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Audi R8

Model	Tightening Specification
R8, Type 42, 4S	120 Nm

Audi Q2

Model	Tightening Specification
Q2, Type GA	140 Nm

Audi Q3

Model	Tightening Specification				
Q3, all types	140 Nm				

Audi Q4 e-tron

Model	Tightening Specification				
Q4 e-tron, Type F4	120 Nm				

Audi Q5

Model	Tightening Specification				
Q5, Type 8R, FY	140 Nm				

Audi Q7, Audi Q8

Model	Tightening Specification
Q7, Type 4L, 4M	160 Nm
Audi Q8, Type 4M	160 Nm

Audi e-tron

Model	Tightening Specification				
Audi e-tron, type GE	160 Nm				

Audi e-tron GT

Model	Tightening Specification				
Audi e- tron GT Type F8	160 Nm				

Security

Model	Tightening Specification
A6 (security)	140 Nm
A8 (security)	140 Nm

7.3 Wheel Bolt Versions



The wheel bolts are different lengths and have ball bearing surfaces depending on the model.

The wheel bolts and wheels will only be secured correctly if the correct wheel bolts are used.

Make sure the correct wheel bolts are installed. Refer to ⇒ Electronic Parts Catalog (ETKA).

The ball bearing surfaces of the wheel bolts must be free of grease and clean.

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Cup shape explanations

There are two cup shapes: rounded and conical.

The spherical cap has a curved surface -arrow A- on the section of a sphere. This design of the spherical cap was used for original rims.

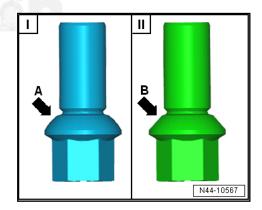
The conical spherical cap has a flat surface -arrow B- on the section of a sphere. This design of the spherical cap is used partially on rims from the accessories program.

- I Wheel Bolt with Spherical Cap
- II Wheel Bolt with Cone-Shaped Spherical Cap

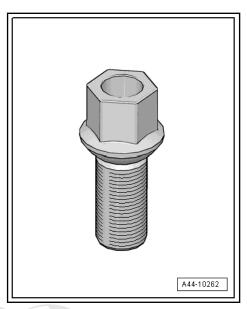


Note

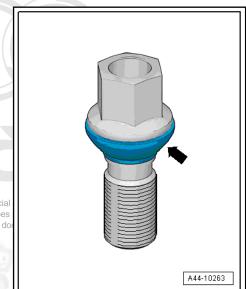
- Make sure the correct wheel bolts are installed. Refer to the ⇒ Electronic Parts Catalog (ETKA) .
- Only the same wheel bolts may be installed on all four wheel rims for every vehicle.



Standard, one-piece wheel bolt.

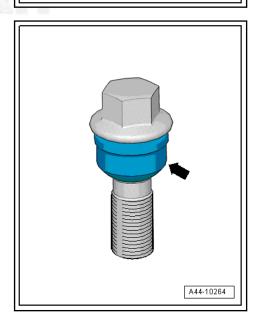


Two-piece wheel bolts with short rotatable spherical cap.



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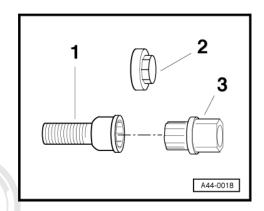
Two-piece wheel bolts with long rotatable spherical cap.



7.4 **Anti-Theft Wheel Bolt**

Anti-Theft Wheel Bolt

- 1 Anti-Theft Wheel Bolt
- 2 Cap
- 3 Wheel Bolt Adapter



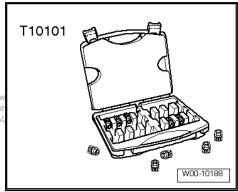
7.5 Master Sets for Anti-Theft Wheel Bolts

Special tools and workshop equipment required

♦ Wheel Lock Set - T10101-



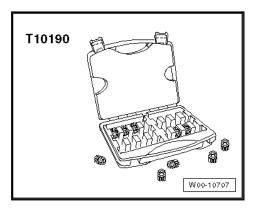
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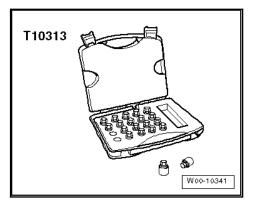
Wheel Lock Set - T10101 A-



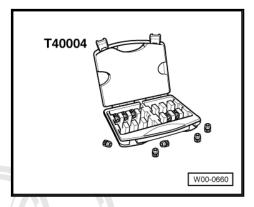
Wheel Lock Set - T10190-



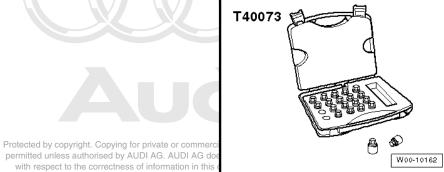
♦ Wheel Lock Set - T10313-



♦ Wheel Lock Set - T40004-



♦ Wheel Lock Set - T40073-



8 Tire Information

- ⇒ "8.1 Tire Requirements and Maintenance", page 62
- ⇒ "8.2 Tire, Labeling", page 66
- ⇒ "8.3 Audi Pax Tires, Side Wall Labeling", page 73
- ⇒ "8.4 EU Tire Label", page 74
- ⇒ "8.5 Radial Tire Structure", page 78
- "8.6 SST Tires, Structure and Labeling, Run-Flat Tire", page 80
- <u>.7 Design, Run-Flat Tire, Seal Inside Technology", page</u>
- ⇒ "8.8 Run-Flat Tire, SST (Self-Supporting Tire)", page 83
- ⇒ "8.9 Tires, Storing", page 85
- ⇒ "8.10 Tires, Aging", page 85

We recommend only using tires with the additional label "AO". These tires are adapted to the applicable Audi models and their characteristics.

Tires must be changed when:

- the legal minimum tread depth of 1.6 mm is reached,
- there is visible damage from mechanical damage,
- Tires are older than 6 years.

8.1 Tire Requirements and Maintenance

- ⇒ "8.1.1 Introduction", page 62
- ⇒ "8.1.2 Wheels, Requirements", page 64
- ⇒ "8.1.3 Influences on Tire Service Life", page 64
- ⇒ "8.1.4 Maintenance (Tire Air Pressure)", page 65

8.1.1 Introduction

This revised information should be a supplement to already existing knowledge and experience.

The goal of this information is to help technicians come to the most clear and certain conclusion possible when dealing with opying for private or commercial purposes, in part or in whole, is not tire damage and complaints. permitted unless authorised by AUDI AG. AUDI AG does not guarantee or accept any liability

This chapter covers information on tires as well as on wheels/ rims.

Tires are high-tech products that are optimally adapted to the operating conditions of modern vehicles.

As with all highly-developed technology products, careful handling, care and maintenance is also required here. Only then can the safety, mileage and driving comfort be ensured over the entire service life of the tire.

Tires are subject to a process that is constantly evolving. Highquality tires are the result of modern construction techniques, production processes and constant quality control. All tires approved by Audi were checked by the technical development team and were adapted to the corresponding vehicle model in coordination with the tire manufacturer.

For this reason, we always recommend installing Audi approved tires and the recommended tire brands when replacing a tire.





Vehicle safety is the top priority. With regards to the different operating conditions, such as:

- different speed ranges
- winter/summer operation
- wet/dry streets

An optimal compromise must be made for driving safety.

Every tire is exposed to many different types of wear through distance and time. It is therefore important that the general for private or commercial purposes, in part or in whole, is not requirements for optimal tire use are always mets authorised by AUDI AG. AUDI AG does not guarantee or accept any liability s of information in this document. Copyright by AUDI AG.

The correct adjustment of the axle geometry is an important requirement for an optimal tire service life. Therefore the axle geometry adjustment must be within the specified tolerance range.



Note

There may be many causes for tire damages and complaints. It is therefore very important to know if the tires or other components are the cause of complaint.

Normal tire wear changes the running characteristics. Driving noises and vibrations can result from this. These are not damages related to tire defects, but are rather side effects from usage. These can be eliminated, at least partially, through specific actions. Running noise cannot be 100% eliminated in certain scenarios.



- A Wet Braking Performance
- B Driving Comfort
- C Steering Precision
- D Driving stability
- E Tire Weight
- F Service Life Expectancy
- G Roll Resistance
- H Hydroplaning

The circular area represents the performance of the tire. It shows how the proportions of requirements A through H can be distributed in the tire structure and in the rubber compound.

Improving one requirement will cause a worsening of another requirement.

Example:

Improving the wet braking performance -A- will cause a reduction in driving comfort -B-, roll resistance -G- and the service life expectancy -F-.

The service life expectancy of passenger car tires is not only dependent on the rubber compound and type. The operating conditions, the vehicle-specific conditions and the driving style have a strong influence on the tire mileage.

A considerably mild, economical as well as an extreme, sporty driving style is possible with modern vehicles and the applicable engine. Tire mileage from 5,000 to 40,000 km (to 25,000 miles) and also more is possible.



Note

The driving style is the main influencing factor on the service life of a tire.

8.1.3 Influences on Tire Service Life

The following factors influence the service life of a tire in varying degrees.

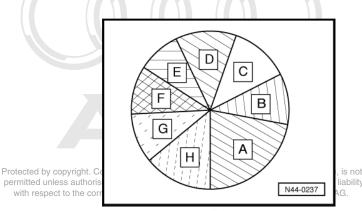
- Speed
- Braking
- Acceleration
- Cornering
- Driving style
- Maintenance
- Tire Pressure

Area:

- Paving
- ◆ Exterior temperature/climate

Vehicle:

Weight





- Tire Pressure
- Dynamic toe values and camber values

Tire operating conditions

Speed range, wet or dry

Tire construction:

Winter/summer



Note

The correct air pressure in the tire also has an influence on the tire service life.



Note

Always make sure the correct air pressure is in the tires.

Maintenance (Tire Air Pressure) 8.1.4

The vehicle weight causes a flattening on the tire contact area. When the tires roll, this produces pressure deformations all around the running surfaces and on the entire belt assembly Low pressure produces higher pressure deformations causing a stronger heat effect and a greater roll resistance. This results in greater wear and a higher safety risk.

Example: specified standard pressure on cold tires depending rotal purposes, in part or in whole, is not on load capacity. permitted unless authorised by AUDI AG. AUDI AG does not guarantee or accept any liability with respect to the correctness of information in this document. Copyright by AUDI AG.

Air pressure (bar)	Air pressure (%)	Mileage (%)
2.3	100	100
1.9	80	85
1.4	60	60
1.0	40	25

An air pressure that is too high causes increased center wear and poor driving comfort. We recommend to always maintain the air pressure specified by the manufacturer.

Diagram 1:

Tread depth throughout mileage for FWD vehicles and V tires

- P Tread Depth
- S Distance
- 1 Front axle
- 2 Rear axle

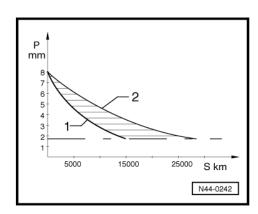


Diagram 2:

Tread depth over mileage for AWD vehicles and V tires

- P Tread Depth
- S Distance
- 1 Front axle
- 2 Rear axle



Note

- The diagrams displayed are not generally applicable.
- They should merely show the wear characteristics on the front and rear axle as well as the wear characteristics on FWD and AWD vehicles.
- Depending on the operating conditions and suspension, the attainable mileages can vary considerably.

It can be seen in diagrams -1- and -2-, that more tread is worn down during a specific mileage on tires that have full tread than on tires that have been driven extensively. The total service life cannot be concluded after the first 5,000 km (3,000 miles), since the wear curve is not linear.

On FWD vehicles, the front tires must also carry the outweighing component of the side and braking power besides the steering and traction power. Because of this load, the front tires wear out considerably faster than the rear tires on FWD vehicles. Even wear on all the tires is achieved by rotating the front and rear wheels regularly. Wheels, Rotating:



Note

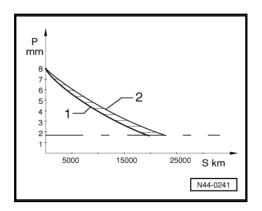
The air pressure data can be found in the sticker attached in the vehicle. If the sticker is not present, it must be ordered via the Electronic Parts Catalog (ETKA) using the VIN. Refer to the ⇒ Electronic Parts Catalog (ETKA) for the replacement part numbers.

8.2 Tire, Labeling

- ⇒ "8.2.1 Tire, Dimensions", page 68
- ⇒ "8.2.2 Load Rating/Load Index (LI)", page 69
- ⇒ "8.2.3 Tires, Reinforced, Extra Load", page 70
- t. Copying for private or commercial purposes, in part or in whole, is not ⇒ "8.2.4 Extra Load (XL) V Winter Tires to page 70 orised by AUDI AG. AUDI AG does not guarantee or accept any liability orrectness of information in this document. Copyright by AUDI AG.
- ⇒ "8.2.5 Speed Rating/Maximum Speed", page 70
- ⇒ "8.2.6 Speed Symbol", page 71
- ⇒ "8.2.7 Winter Tires with Speed Symbol H ", page 72
- ⇒ "8.2.8 Winter Tires with Speed Symbol V", page 72

Side Wall Lettering

Example: Dunlop SP Sport 9000

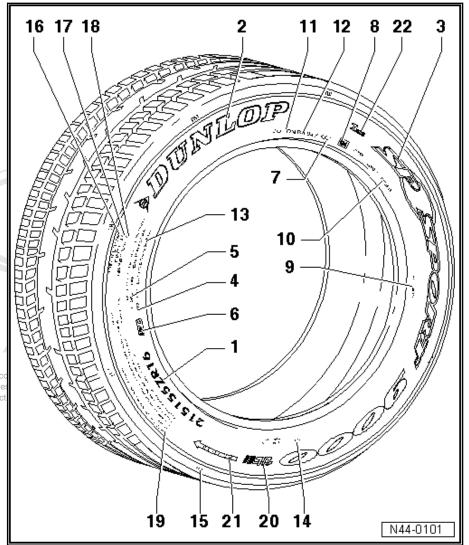


1 - Size Designation (215/55 ZR16)

- □ Refer to ⇒ "8.3 Audi Pax Tires, Side Wall <u>Labeling</u>", page 73
- 2 Manufacturer (trade name)
- 3 Tread designation
- 4 Label for Tubeless Tires
- 5 Radial Construction (radially-oriented fibers in shell)
 - Refer to ⇒ "8.5 Radi- al Tire Structure", page
 - □ Refer to ⇒ "8.6 SST Tires, Structure and Labeling, Run-Flat Tire", <u>page 80</u>

Refer to ⇒ "8.7 <u>Design, Run-</u> <u>Flat Tire, Seal Inside Technol-</u> ogy", page 81

- 6 Note for Versions with »Rim Protection«
- 7 Production Date see tire aging





Note

Retreaded tires also have a label "R" or "Retreated" and the date when it was retreaded instead of the production date.

- 8 E number = Approval number The tires fulfill all European guidelines.
 - ☐ European guidelines according to ECE-R30, EEC92/93 or ECE R 117



Note

- Based on the EU guideline ECE-R117, tires that fulfill the new driving noise limits also have an "S" designation for Sound on the sidewall.
- For passenger vehicle tires with a cross section up to 185 mm: from 10/01/2009
- For passenger vehicle tires with a cross section from 185 mm to 215 mm: from 10/01/2010

- For passenger vehicle tires with a cross section over 215 mm: from 10/01/2011
- 9 Production country manufactured in Germany.
- 10 Internal tread code from manufacturer
- 11 Department of Transportation the tires fulfill the guidelines of the American traffic authorities
- 12 Example: Dunlop SP Sport 9000
- DOT identification number code for production plant, tire size and tire version
- 13 Maximum permitted load (Load Index)

Refer to ⇒ "8.2.2 Load Rating/Load Index (LI)", page 69



Additional designation of "Reinforced" or "Extra Load" or "XL" is required for tire load capacity increase

- Refer to ⇒ "8.2.3 Tires, Reinforced, Extra Load", page 70
- Refer to ⇒ "8.2.4 Extra Load (XL) V Winter Tires", page 70
- 14 Number of layers in the tread center and in the sidewalls and specification of material
- 15 Position of Tread Wear Indicator (TWI)
- 16 Relative service life expectancy abrasion resistance refers to a US-specific standard test
- 17 Rating of wet braking capability: A, B or C based on US-specific test
- 18 Rating of temperature stability: A, B or C based on US-specific test
- 19 Safety Precaution for Use or Fitting of Tires
- 20 Indication of "Ultralight construction", tire is up to 30% lighter
- 21 Specified running direction of tire
- 22 Inmetro label, is only required for the Brazilian market

Run-flat tires, SST (Self Supporting Tire) and PAX have a special designation on the tire sidewall depending on the manufacturer.



NOTICE

It is mandatory for run-flat tires to have a tire pressure monitoring system in the vehicle. Refer to ⇒ "6 Tire Pressure Monitoring System", page 41

8.2.1 Tire, Dimensions

Refer to ⇒ "8.3 Audi Pax Tires, Side Wall Labeling", page 73

Tire Dimension Explanation

Tires	Speed	1	2	3	4	5	6	7
Summer tires Prote perm	cted by to 240 km/hg f itted (449 authriph) by A in respect to the correctness	udi ag. aud	omm 6/5 ial pu II AG does no n in this docu	t guarantee	or accept a	ny liability	V	-
Winter Tires	Up to 160 km/h (99.4 mph)	195	65	R	15	91	Q	M + S
Winter Tires	Up to 190 km/h (118.1 mph)	195	65	R	15	91	Т	M + S



Tires	Speed	1	2	3	4	5	6	7
Maximum high speed tire	Over 240 km/h (149.1 mph)	225	50	ZR	16	91	-	-

- Tire Width
- Aspect Ratio in %
- Tire construction code "R" (means radial)
- 4 -Rim Diameter Designation
- 5 -Load Index (LI)
- 6 -Speed Rating
- Winter Tire/Designation For All-Season Tire

8.2.2 Load Rating/Load Index (LI)

The load rating can be found on the sidewall of the tire. It provides information about the maximum load that the tire can bear.

The load rating is located in the tire size designation, for example 195 R 15 91 H. It is indicated on the tire as a code in accordance with an ETRTO standard. The following table shows the load capacity index used by Audi with the corresponding load rating of the tires.

Load index	Maximum load rating of tire in kg
76	400
77	412
78	Protected by observight. Copying for private or commercial purposes, in part or in whole, is not permitted unle 425 norised by AUDI AG. AUDI AG does not quarantee or accept any liability
79	with respect to the correctness of information in this document. Copyright by AUDI AG.
80	450
81	462
82	475
83	487
84	500
85	515
86	530
87	545
88	560
89	580
90	600
91	615
92	630
93	650
94	670
95	690
96	710
97	730
98	750
99	775
100	800

Load index	Maximum load rating of tire in kg
101	825
102	850
103	875
104	900
105	925
106	950
107	975
108	1000
109	1030
110	1060
111	1090
112	1120

8.2.3 Tires, Reinforced, Extra Load

Tires with XL designation have a higher load rating than tires without this designation.

Some time ago, the designation "Reinforced" was replaced with the designation "Extra Load" by some tire manufacturers. In countries outside Europe, this designation has been conventional for some time. There are no technical differences.

Some tire manufacturers also use the "XL" designation for Extra Load tires.

Tires with the designations "Reinforced" or "Extra Load (XL)" are the same.

8.2.4 Extra Load (XL) V Winter Tires

V winter tires with XL designation have a higher load capacity than the V winter tires without this designation.

Higher speeds can be attained with XL V-winter tires, but the maximum speed of the V tires of 240 km/h (149.1 mph) is not permissible for every vehicle.

The same conditions apply for these tires as for V winter tires without special designation!

8.2.5 Speed Rating/Maximum Speed

Code o	n the sidewall	permitted maximum tire speed in km/h
L		120
М		130
N		${}_{ m g}140$ rivate or commercial purposes, in part or in w
Р	permitted unless authorised by with respect to the correctno	ALDI AG. AUDI AG does not guarantee or accept as Dinformation in this document. Copyright by Al
Q		160
R		170
S		180
Т		190
U		200
Н		210
V		240
W		270

hole, is not any liability JDI AG.



	permitted maximum tire speed in km/h
Υ	300
ZR	Over 240

8.2.6 Speed Symbol

The speed symbol (for example "V") behind the tire size specification (such as $185/65\ R\ 14\ 86V)$) indicates the maximum permitted speed (v_{max} 240 km/h (149.1 mph)) for the tire.

The vehicle tires must be selected so that their maximum permitted speed is over the speed that can be attained by the vehicle ("model-dependent").

Vehicles with national type approval within Germany

If the vehicle has a national type approval, the maximum vehicle speed is calculated as follows:

Formula for vehicles with speed "v" up to 150 km/h (93.2 mph)

 $v_{max} = 1.03 \times v + 3.5 \text{ km/h} (2.2 \text{ mph})$

Example: specified maximum speed v = 145 km/h (90.1 mph)

 $v_{max} = 1.03 \times 145 \text{ km/h} (90.1 \text{ mph}) + 3.5 \text{ km/h} (2.2 \text{ mph}) =$ 152.85 km/h (95 mph)

In this example, a "Q" tire or a tire with a higher valued speed symbol must be used.

Formula for vehicles with speed "v" from 151 km/h (93.8 mph)

 $v_{max} = 1.01 \times v + 6.5 \text{ km/h} (4 \text{ mph})$

Example: specified maximum speed v = 163 km/h (101.3 mph)

 $v_{max} = 1.01 \times 163 \text{ km/h} (101.3 \text{ mph}) + 6.5 \text{ km/h} (4 \text{ mph}) =$ 171.13 km/h (106.3 mph)ected by copyright. Copying for private or commercial purposes, in part or in whole, is not permitted unless authorised by AUDI AG. AUDI AG does not guarantee or accept any liability.

In this example, a "S" tire or a tire with a nigher valued speed document. Copyright by AUDI AG. symbol must be used.

Vehicles with EC type approval

If the vehicle has an EC type approval, the permitted speed for the tires is calculated according to the following formula for all vehicles:

 $v_{max} = 1.05 x v$

Example: specified maximum speed v = 172 km/h (106.9 mph)

 $v_{max} = 1.05 \times 172 \text{ km/h} (106.9 \text{ mph}) = 180.60 \text{ km/h} (112.2)$ mph)

In this example, a "T" tire or a tire with a higher valued speed symbol must be used.

Using tires with a higher valued speed symbol is permitted. The same also applies to tires with a higher valued load index.



Note

The specified maximum speed is to be inserted for the letter "v" in section I or II in the certificate of registration under field "T or in the vehicle title under item 6. This conversion is required because, for technical reasons, all vehicles attain different maximum speeds within a legally permitted tolerance.



8.2.7 Winter Tires with Speed Symbol "H"

Vehicles with a permitted speed greater than 210 km (130.5 miles)/h:

- Vehicles with a permitted speed greater than 210 km/h (130.5 mph) must use winter tires with the speed symbol "H" "maximum 210 km/h (130.5 mph)".
- A warning sign needs to be applied in the driver field of vision.
- The warning sign needs to point out the maximum speed of "maximum 210 km/h (130.5 mph)", winter tires or M+S- tires.
- The relevant load index "LI" of the tire must always be ensur-

Attention, winter tires

Maximum permissible speed ...km/h

8.2.8 Winter Tires with Speed Symbol "V"

The tire industry delivers winter tires with V-rating also. These tires can only be used under certain conditions up to the maximum permissible speed $v_{max.} = 240 \text{ km/h} (149.1 \text{ mph}).$

Vehicles with V-tires:

Vehicles that require V-tires according to vehicle registration, can be driven with V-winder tires without limitations library speed, in part or in whole, is not can be driven with V-winder tires without limitations library speed, in part or in whole, is not rating "v" max = 240 km/h, [219] mph) es of information in this document. Copyright by AUDI AG.

Vehicles with W-, Y- or ZR-tires:

Vehicles that require W, Y, or ZR tires according to vehicle registration, cannot be driven with V winter tires up to "v" max = 240 km/h (149.1 mph) under certain conditions.

Why?

V summer tires and V winter tires without special designation guarantee 100% of the load capacity indicated by their Load Index ("LI") only up to a speed of 210 km/h (130.5 mph).

Speeds above 210 km/h (130.5 mph) are only possible if the maximum load capacity of the tire is not exceeded. The load capacity of the tire decreases as the speed increases.

The maximum permitted axle load and the attainable maximum speed for certain Audi vehicles are so high that the load capacity of V tires is not sufficient for speeds above 240 km/h (149.1 mph).

Example: tires 205/55 R 16 91V

The Load Index (LI) 91 for this tire indicates a load capacity of 615 kg (1,355.84 lbs) per tire up to 210 km/h (130.5 mph).

At 240 km/h (149.1 mph), the load capacity of this tire is reduced to only 560 kg (1,234.59 lbs). For this reason, the axle load can only be maximum 1,120 kg (2,469.17 lbs).

The vehicle has an additional axle load of 1,150 kg (2,535.31 lbs) and an attainable maximum speed of 232 km/h (144.2 mph). This vehicle can be driven with V winter tires up to a speed of 230 km/h (142.9 mph).



This applies to all V winter tires that do not have a special designation.

Permission stipulations in Germany

Only when using winter tires is it permitted that the highest speed attainable by the vehicle lies above the highest speed of winter tires specified by the speed symbol.

In this case, a warning sign in the view of the driver must be applied with the following content:

Attention, winter tires	
Maximum permissible speedkm/h	

8.3 Audi Pax Tires, Side Wall Labeling



NOTICE

It is mandatory for run-flat tires to have a tire pressure monitoring system in the vehicle. Refer to ⇒ "6 Tire Pressure Monitoring System", page 41

		1	2	3	4	5	6	7	
Summer tires	Up to 240 km/h (149.1 mph)	195	65	R	15	91	V		
Winter Tires	Up to 160 km/h (99.4 mph)	195						M+S	
Winter Tires	Up to 190 km/h (118.1 mph)	195	65 v	ill respect to t	he 5 rrectness	on formation	this documer	arantee or accu t Md p \$ right by	ept any lia AUDI AG
Maximum high speed tire	Over 240 km/h (149.1 mph)	225	50	ZR	16	19	Z		

- Tire Width
- 2 -Aspect Ratio in %
- 3 -Tire construction code "R" means radial
- 4 -Rim Diameter Designation
- Load index 5 -
- 6 -Speed Rating
- Winter Tire/Designation For All-Season Tire

8.4 **EU Tire Label**

- ⇒ "8.4.1 Brief Overview EU Tire Label", page 74
- ⇒ "8.4.2 EU Tire Label, Purposes", page 75
- ⇒ "8.4.3 EU Tire Label, Categories", page 75

8.4.1 **Brief Overview - EU Tire Label**

Starting on 11/01/2012, tire manufacturers must comply with the new EU Regulation (EG) 1222/2009 (Tire Labeling Regulation).

The Tire Labeling Regulation requires that information pertaining to rolling resistance (fuel efficiency), wet grip and external rolling noise be printed on a uniform EU tire label. The goal of this is to increase safety and ecological and economical road transport efficiency by using tires that are safer, quieter and use less fuel.

The new EU tire label contains concrete information for seven classes from A to G.

There are 3 different categories:

1 - Roll Resistance

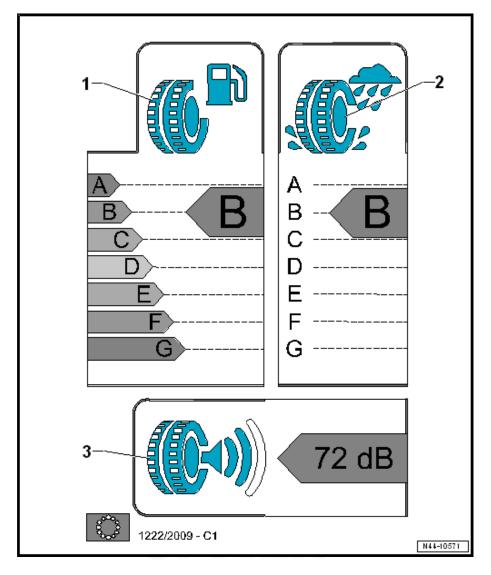
Explanations. Refer to ⇒ page 75

2 - Wet Grip

Explanations. Refer to <u>⇒ page 76</u> .

3 - Noise Emission

Explanations. Refer to ⇒ page 77



8.4.2 EU Tire Label, Purposes

- ◆ To reduce fuel consumption
- To improve traffic safety
- To reduce traffic noise

The EU tire label provides the end-user with information about the tire's most important properties. However, it does not provide all critical safety criteria.

- Explaining additional tire properties can exert a sustained influence on the purchasing decision.
- The customer should be made aware of the limited reliability of the label regarding tire properties. For example, the label says nothing about the winter properties on winter tires.
- Tire tests remain important sources of information for dealers and end-users.

The tire test check many other performance factors, including the following:

- Aquaplaning properties
- Driving stability
- Steering precision
- Service life
- Braking properties

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Performance under winter conditions

EU Tire Label, Categories

Roll resistance. Refer to <u>⇒ page 75</u>.

Wet grip. Refer to ⇒ page 76.

Noise emission. Refer to ⇒ page 77.

Roll resistance

Roll resistance:

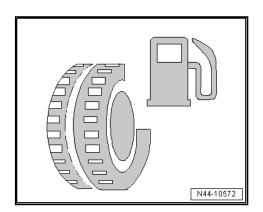
- Is defined as the amount of energy used by a tire to travel to a given distance.
- This corresponds to the loss of energy in units per defined distance.
- This is expressed as an quotient of energy in Newton meters (Nm) and of distance in meters (m). Thus, the rolling resistance is expressed as a force in Newtons (N).

The rolling resistance of a tire is defined by the rolling resistance coefficient cp:

- ♦ cR Rolling resistance coefficient
- FR Rolling resistance force
- ◆ Z Vehicle weight (sum of all-wheel loads)

Goal

- To reduce rolling resistance
- To economize fuel and CO2



Wheel and Tire Guide General Information - Edition 01.2024

Evaluation

- Separated into fuel efficiency classes A to G
- Class D is not used



Note

- The fuel efficiency classes are listed in EU Regulation (EG) 1222/2009. Tires categories are established by this regula-
- The rolling resistance is determined by prescribed tests performed by the tire manufacturer.
- The lower the rolling resistance, the lower the fuel consumption.

A - Lowest rolling resistance coefficient = lowest fuel consump-

B - + 0.10 liters / 100 km

C - + 0.12 liters / 100 km

E - + 0.14 liters / 100 km

F - + 0.15 liters / 100 km

G - + 0.15 liters / 100 km

Wet grip

Definition

For the wet grip, the wet grip parameter G must be determined. The wet grip parameter G is defined by testing the distance required by a standardized vehicle to brake from 80 km/h (49.7 mph) down to 20 km/h (12.4 mph) on a wet, even road surface. The test is performed using predefined standard reference test tires (SRTT), allowing for the wet grip parameter G to be determined. Mean fully developed deceleration (mfdd) is used for the test.

The mean fully developed deceleration is determined thusly:

$$mfdd = 231.48S$$

S - the braking distance between 80 km/h and 20 km/h (49.7 mph and 12.4 mph) in meters

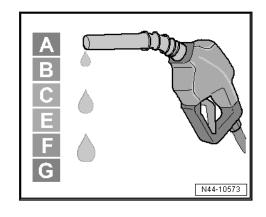
The wet grip parameter G is determined thusly:

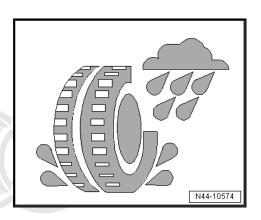
G = mfdd of the tire to be checkedmfdd of the standard reference tire

Protected by copyright. Copying for private or commercial purposes, in part or in whole, is not mfdd - mean fully developed deceleration uthorised by AUDI AG. AUDI AG does not guarantee or accept any liability respect to the correctness of information in this document. Copyright by AUDI AG

Goal

- Good wet grip on tire
- Sharp decrease in braking distance





Evaluation

- Separated into wet grip classes A to G
- Classes D and G are not used



Note

- The wet grip classes are listed in EU Regulation (EG) 1222/2009. Tires categories are established by this regula-
- The lower the wet grip parameter, the shorter the braking distance.
- A Lowest Wet Grip Parameter = Shortest Braking Distance
- B 3 to 6 m (9.8 to 19.7 feet) longer braking distance compared to category A
- C 3 to 6 m (9.8 to 19.7 feet) longer braking distance compared to category B
- E 3 to 6 m (9.8 to 19.7 feet) longer braking distance compared to category C
- F 3 to 6 m (9.8 to 19.7 feet) longer braking distance compared to category È
- 1 When emergency braking at 80 km/h (49.7 mph), the difference between using class A and class F tires can be more than 18 m (59.1 feet).

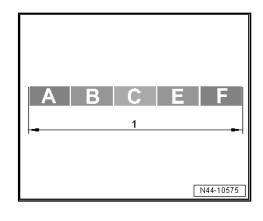
Noise emission

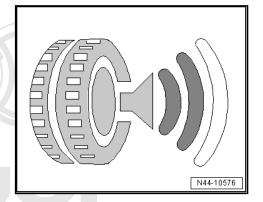
Goal

- ◆ To reduce pass-by noise
- ◆ To reduce noise impact

Evaluation

- Take measurements from outside of the vehicle only
- Divided into three classes





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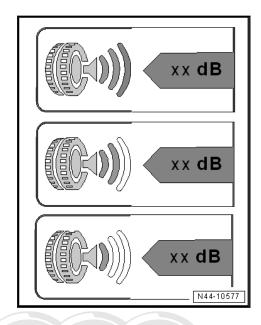


- Wheel and Tire Guide General Information Edition 01.2024
- Three black waves signify the worst performance. The tire produces external rolling noise, which falls below the current EU Directive 2001/43/EG limit. The limit surpasses the future limit set by EU Regulation (EG) 661/2009, which will go into effect in 2016.
- Two black waves: the tire noise level does not exceed the future limit set by EU Regulation (EG) 661/2009, which will go into effect in 2016.
- One black wave: the tire noise level does not exceed the future limit set by EU Regulation (EG) 661/2009, which will go into effect in 2016, by at least three decibels.



Note

- Reducing the noise measured value from two black waves down to one corresponds to 3 dB, which halves the noise level.
- Please note that extreme tire rolling noise does not always correspond to the noise in the vehicle interior.



8.5 Radial Tire Structure

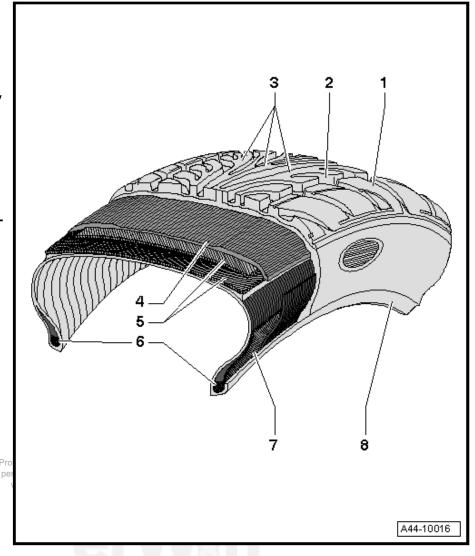
The cross section of a ply tire is shown in the image.



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- 1 Tread Lug
- 2 Tread Groove
- 3 Tread
- 4 Nylon Ply
- 5 Ply layers, consists mostly of steel
- 6 Bead core, consists of steel wires vulcanized into rubber Make sure tire is securely fitted on the rim.
- 7 Bead Reinforcement
- 8 Rim flange protection, protects the rim and tire from abrasion due to, for example, contact with the curb. Tires with rim protection are identified by the abbreviation MFS.



The nylon ply -4-, belt layers -5-, bead cores -6- and bead reinforcements -7- make up the shell. The shell is the »load-bearing structure« of the tire.

8.6 SST Tires, Structure and Labeling, Run-Flat Tire

A tire pressure monitoring display is necessary when using runflat tires.

Tire damage and the pressure loss resulting from it is not always recognizable.

SST tires are identified with a special code (RSC = Run-flat System Component) on the side wall.

The identification on the side wall of run-flat tires can differ depending on the manufacturer.

Self-Supporting Tire stands for a tire system with emergency running characteristics in the event of a loss of pressure. In the event of a flat tire, the driver can continue driving to a limited extent to the next workshop > Owner's Manual.

Advantage

SST tires make it possible to drive up to 50 km (31.1 miles) at a maximum of 80 km/h (49.7 mph) even with a complete loss of pressure.

Driving style, speed, road surface, weather conditions, tire condition and tire load influence the distance not guarantee or accept any lial dition and tire load influence the distance.

With SST tires, it is not necessary to immediately change a tire when it suffers from a complete loss of pressure (for example no tire changing in an area with low visibility or in dangerous conditions).

Braking, steering and driving performance remain for the most part even after the tire loses pressure.

A spare wheel is no longer necessary when using SST tires. From the view of the customer, this means: saving space and weight.

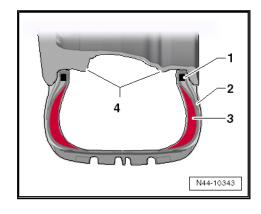
Assembly

- 1 Bead with Bead Core
- 2 Sidewall
- 3 Sidewall Reinforcement
- 4 Rim with extended hump (EH2) on both sides required when using run-flat tires

Technology in detail

Standard tires without emergency running characteristics

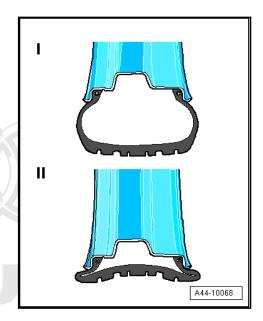




- -I- standard tires with air.
- -II- standard tires without air.
- If the standard tire loses air, the rim presses the side wall together. The rubber in a flat tire is heated strongly and quickly loses its properties.

SST tires with reinforced side wall

The self-supporting, reinforced side walls from the basis of SST technology.



- I- SST tires with air.
- -II- SST tires without air.
- Especially thick side walls -A- support the empty tires on a standard rim and the vehicle remains maneuverable. A special rubber mixture reinforces the tires and supports the vehicle in an emergency.

The reinforced side walls, unlike a standard tire, prevent the tire flanks from pinching between the road and rim when flat.

Difference in version H2 and EJ2 Extended Hump Rim

- The increased hump on the EH2 Extended Hump Rim prevents the SST tire from springing off when pressure is lost.
- EH2 Extended Hump Rim builds up toward the center of the wheel.

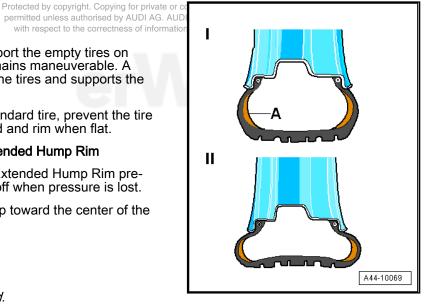


Note

The clearance to the brake is reduced.

Design, Run-Flat Tire, Seal Inside 8.7 **Technology**

- Seal Inside tires are not run-flat tires. They are legally classified as standard tires. Combining Seal Inside and standard tires is permitted.
- The vehicle can be equipped with run-flat tires as an option.
- The Seal Inside technology is a system that allows the vehicle to continue driving even if the tire has been punctured by a nail or screw: a protective coating on the inside of the tire automatically seals any holes caused by a screw or a nail.
- This way no air can escape. The sealant can work on almost all types of leaks, that result from objects with a diameter of up to 5 millimeters.



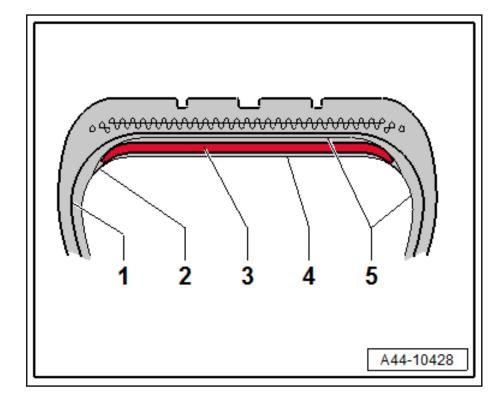


It is mandatory for run-flat tires to have a tire pressure monitoring system in the vehicle. Refer to ⇒ "6 Tire Pressure Monitoring System", page 41

- 1 Shell
- 2 Belt Edge
- 3 Self-Sealing

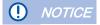
Layer of sealant material is only inside the running surface.

- 4 Nylon Layer
- 5 Top Layer

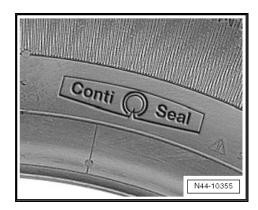


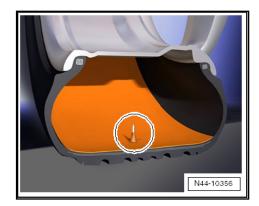
Mobility Tires

- The seal inside technology has already been incorporated by the tire manufacturer into the tire manufacturing process.
- The seal inside technology is a self-adhering, viscous sealant, which is evenly applied to the inner side of the running surface from shoulder to shoulder.
- The sealant is an integral component of mobility tires.
- There is a special logo on the side wall of the tire which identifies it as a mobility tire.
- Example: the sidewall of a Continental tire

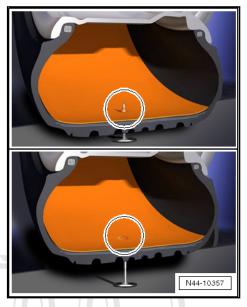


The sealant is not intended to be a permanent tire repair after a puncture has happened.





- If a foreign object with a diameter of up to 5 mm punctures the running surface of a tire, the sealant immediately closes the puncture immediately and seals it to prevent air leakage.
- The sealant is designed to seal most punctures caused by a foreign object, which has a diameter up to 5 mm.
- The Seal Inside technology reduces the frequency of flat tires, but it is not intended to make is possible to drive on a tire which has minimum tire pressure or is completely flat.



8.8 Run-Flat Tire, SST (Self-Supporting Tire)

⇒ "8.8.1 Run-Flat Tire, General Information", page 83

⇒ "8.8.2 Run-Flat Tire, Retrofitting/Conditions for use of Run-Flat Tires", page 84

⇒ "8.8.3 Run-Flat Tire, Repair", page 85

8.8.1 Run-Flat Tire, General Information

ht. Copying for private or commercial purposes, in part or in whole, is not Run-flat tires have a reinforced sidewall in comparison to stand by AUDI AG. AUDI AG does not guarantee or accept any liability and tires. This reduces the tendency for the sidewall to roll when there is a loss of pressure and prevents the sides of the tire from being pinched. This allows the vehicle to be driven while still maintaining close to normal driving behavior. It also eliminates the need to install the spare tire in dangerous situations such as on the highway or in poor weather conditions.



Assessing a damaged tire may only be done by a trained technician.



Run-flat tires must be replaced after they have gone flat.

Pay close attention to the installation instructions.



When there is a flat tire, the vehicle can still be driven to the nearest workshop (within approximately 50 km (31.1 miles)) as long as the vehicle speed (maximum 80 km/h (49.7 mph)) and driving style are adapted accordingly. Refer to the ⇒ Owner's Manual.

If there is a flat tire, the driver is ultimately responsible for checking the affected tire and deciding if it is possible to continue driving.

-I- Tires with normal pressure

- 1 Run-flat tires (reinforced sidewall -red-)
- 2 Standard tires

-II- Tires without air pressure

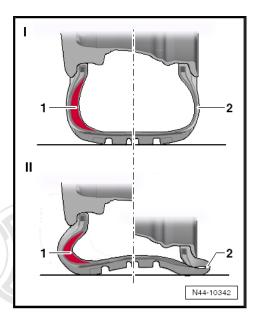
If the standard tire -2- loses pressure, the rim pushes the side wall together. When the tire is the flat, the sidewall becomes extremely hot from the rolling motion and or is pinched. This destroys the tire.

In run-flat tires -1-, the reinforced sidewall (-red-) supports the tire. Because of a special rubber compound and the reduced flexing of the reinforced sidewall, the tires does not become as hot and the vehicle can still be steered.



Note

Read and follow the special requirements for using run-flat tires. Refer to ⇒ "8.8.2 Run-Flat Tire, Retrofitting/Conditions for use of Run-Flat Tires", page 84 .



8.8.2 Run-Flat Tire, Retrofitting/Conditions for use of Run-Flat Tires



Note

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Using run-flat tires on vehicles is permitted only if the run-flat tire is supplied with the vehicle either as standard equipment or as an option.

Because pressure loss in a run-flat tire is not always visible with the naked eye, these tires should only be used on vehicles equipped with a tire pressure monitoring system. This system warns the driver when the tire pressure falls below a certain

The following are permitted:

direct measuring system

indirect measuring system

Only mount run-flat tires on disc wheels with an extended double hump (extended hump - EH2).

Do not install both run-flat tires and standard tires, even if both tires on an axle will be the same.

A standard tire can only be installed in exception cases for a short time or a limited driving distance. The specific characteristics designed for driving with a flat tire will not be available. The driver must be informed of this.



Always pay attention to the recommended tire brand. Refer to ⇒ Wheel and Tire Guide; Rep. Gr. 44.

8.8.3 Run-Flat Tire, Repair



CAUTION

Tire destruction due to tire going flat.

Replace the tire.

General Information

- The wheel must be inspected before mounting, as with conventional wheel and tire systems.
- Check the rim for damage after a flat tire (true running, axial run-out, other damage) because the rim could be damaged in an emergency by driving through a pothole.
- A damaged rim should be replaced.

8.9 Tires, Storing

Complete wheels

Tires mounted on wheels can be stored flat, stacked on upon another. The air pressure should be raised to a maximum of 3 bar (43.51 psi).

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Tires without rims are best stored standing upright. If tires lie stacked upon another for longer periods of time, they will be strongly pressed together. This makes mounting more difficult because the tires do not lie on the bead seat. If the tires are stored standing vertically, it is recommended to turn them every 14 days to avoid severe flattening.

8.10 Tires, Aging

Tires age as a result of physical and chemical processes whereby the function can be impaired. Tires which are stored for longer periods of time become harder and brittle faster than tires which are constantly in use on a vehicle. Older tires may develop hairline cracks from aging. When tires are in constant use, the flexing activates softeners in the rubber which prevents hardening and the formation of cracks.

Therefore, one should note not just the tread depth but also the age of spare tires, stored tires and tires which are not constantly in use. Tire age can be determined by the DOT code which contains, among other things, the production date of the tire.

Example of a DOT code:

DOT	 5	0	0	2	<
					stands for 2002
			Product	ion year	
	Calendar week				,

In this example, the production date is 12/13/2002. Up to 12/31/1999, the DOT number was three digits.

Recommendation:

We recommend using tires that are older than 6 years only in the case of an emergency and with a cautious driving style.

- When new tires are fitted, the spare tire may also be used if it is in flawless condition and is not more than 6 years old. The age of the tire has a great influence on the high-speed capability of the tire. The combination of a spare tire which is several years old with new tires is possible, but it can influence the car's handling.
- Tires are constantly being developed; this can lead to, for example, slight changes in the rubber compound, even if the tires are of the same make, size and tread.
- For driving safety reasons, tires of the same make and with the same tread should be mounted on one axle.
- AWD vehicles must always be equipped with four wheels with tires of the same size, construction type, tread patternited by copyright. Copying for private or commercial purposes, in part or in whole, is not and make. Excluded from this are vehicles which were delived unless authorised by AUDI AG. AUDI AG does not guarantee or accept any liability ered by Audi AG with different tire sizes on the front axlevandspect to the correctness of information in this document. Copyright by AUDI AG. rear axle.



Note

- Only use tires of the same construction type, size and tread on all four wheels.
- Excluded from this are vehicles which were delivered by Audi AG with different tire sizes on the front axle and rear axle.





9 **Tire Sealant**

⇒ "9.1 Tire Sealant, Disposing", page 87



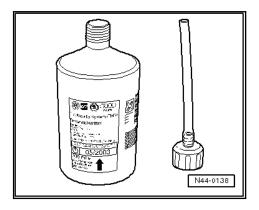
If tire sealant was used, then the wheel electronics on that particular wheel must be replaced.

Tire sealant in the bottle has a limited storage life.

Therefore, the expiration date is indicated on the bottle -arrow-.

In this example, the expiration date is 05/2003, it must be replaced.

If the bottle was opened, for example for a flat tire, it must also be replaced.



9.1 Tire Sealant, Disposing

- ◆ Tire sealant or residue from it must not be mixed with other wastes/fluids
- Accumulating fluid residue from tire sealant must be collected and placed in a plastic container. The plastic containers can be sent for recycling together with the tire sets (if the expiration date has passed).
- The return or recycling can take place using the existing workshop disposal systems
- Check with the company responsible for trash pickup for the importer.



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10 Rim Information

- ⇒ "10.1 Rim, Structure", page 88
- ⇒ "10.2 Identification", page 89
- ⇒ "10.3 Composite Wheels", page 90
- ⇒ "10.4 Light Alloy Wheels, Care and Maintenance", page 90
- ⇒ "10.5 Light Alloy Wheels, Preparing", page 91
- ⇒ "10.6 Hub Cap for Alloy Wheels with Open Threaded Connection, Removing and Installing", page 91
- ⇒ "10.7 Decorative Trims, Replacing", page 92
- ⇒ "10.8 Valve, Removing and Installing", page 99

10.1 Rim, Structure



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1 - Rim Flange

Stop for the side tire bead

2 - Hump (H2) on Both Bead Seats

- Prevents the tire from slipping off the bead seat when driving around tight curves
- An extended hump (EH2) is required when using run-flat tires.

3 - Bed

Makes it easier to mount the tire

A - Rim Width

- □ Distance between the tire contact surfaces on both rim flanges
- Dimensions in inches

B - Rim Diameter

- Distance between the rim contact surfaces on the opposite bead seats
- Dimensions in inches

C - Offset

- Distance between the vertical wheel center and the inner wheel contact surface
- Dimensions in mm

D - Pitch Circle Diameter

- ☐ Circle diameter where the wheel bolt holes are located
- Dimensions in mm

E - Center Hole

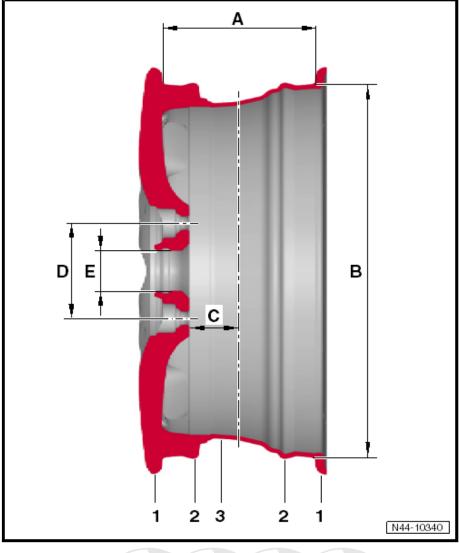
- Enables centering
- Dimensions in mm

10.2 Identification

There are several specifications located on the rim. The following examples shows the rim identification:

Part number 4K0-601-025-AJ, size 8,5Jx19, ET-40 by copyright. Copying for private or commercial purposes, in part or in whole, is not

	se authorised by AUDI AG. AUDI AG does not guarantee or accept any liability 4K0:601n025 AJ mation in this document. Copyright by AUDI AG.
Size of disc wheel:	8.5 J x 19 8.5 - Rim width in inches J - Shape of rim flange 19 - Rim diameter in inches
Offset (ET):	40 in mm
Indication for hump on bead seat:	EH2 Extended Hump. Refer to ¹⁾ .





1) Extended Hump, raised round hump on both bead seats. These ensure that when using a tire with emergency mode properties in airless condition, the tire does not slip from the bead seat. Wheels with EH2 are only necessary if tires with emergency mode properties are mounted



Note

Rims with the related part numbers must always be ordered via the ⇒ Electronic Parts Catalog (ETKA).

10.3 Composite Wheels

Composite wheels consist of various parts.

The primary components are rims and wheel discs. These components are fastened to each other with special screws and a special procedure. This ensures the wheel's function, proper seal, safety and true running. These important requirements cannot be guaranteed under shop conditions and using shop tools.



Note

Do not disassemble or repair composite wheels.

10.4 Light Alloy Wheels, Care and Mainte-

To maintain the decorative appearance of light alloy wheels for a long time, regular care is necessary.

In particular, road salt and dust from brake abrasion must be thoroughly washed off every two weeks. Otherwise, the paint of the light alloy wheel will be attacked.



Note

Not all alloy wheels are suitable for winter use. Road salt can damage the surface and lead to paint damage.

Cleaning agent

The following are appropriate cleaning agents:

- Water or water and soft soap
- Water and diluted acetic acid
- Light alloy wheel cleaning agents without acids or harsh solvents

Do not exceed the soaking time of the cleaning agent.

The shorter the specified soaking time is, the stronger and more aggressive the cleaning solution is.

Paint damage

If the paint is damaged by e.g. stone impact, fix the paint damage as posts in the second of with respect to the correctness of information in this document, Copyright by AUDI AG.



Removing adhesive residue from glued balance weights on light alloy rims

- Harsh solvents and acids attack the paint on light alloy wheels and the surface of the wheel becomes matte and milky. These agents therefore must not be used.
- ◆ To remove adhesive residue on light alloy wheels, use light alloy cleansers or benzene-based cleanser. Do not exceed the soaking time of the cleaning agent.
- After cleaning or removing adhesive residue on the tires, they must be rinsed again with water.

10.5 Light Alloy Wheels, Preparing

- Do not repair damaged rims by heating, welding or adding or removing material.
- Do not repair damaged or deformed rims or rims with cracked or deformed bolt holes.
- Only prepare wheels with tested and specified original paint materials.
- No warranty claims can be made against the manufacturer after preparing rims.

Do not repair rims that have cracks forming on the edges. Replace them immediately.

Cutting work, application of heat and welding applications of any kind are not permitted.

Reshaping material is not permitted.

The true running and axial run-out deviations before preparation must not exceed the manufacturing tolerance of 0.8 mm.

Only cast light alloy wheels may be primed. These wheels have the material identification AISi xx on the inside.

Forged wheels may only be painted.

The preparation is limited to painted surfaces.

Wheels that have been worn smooth that only have a clear coat may not be repaired.

Only surface damage on the visible side of the wheel may be reconditioned.

Damage must not be more than 1 mm deep.

Up to 50 mm of the rim flange may be removed and filled.

10.6 **Hub Cap for Alloy Wheels with Open** Threaded Connection, Removing and, in part or in whole, is not

Installing unless authorised by AUDI AG. AUDI AG does not guarantee or accept any liability with respect to the correctness of information in this document. Copyright by AUDI AG.

Removing

The wheel is removed.



Note

Hold the cap secure -1- with the hammer.

Installing

 Hold the cap -1- flush against the opening in the aluminum rim from the outside.



Note

Do not tilt the cap.

- Press on the cap so that it is secure inside the opening in the aluminum rim.
- Make sure the cap is secure inside the aluminum rim.

10.7 Decorative Trims, Replacing

- ⇒ "10.7.1 Bonded Decorative Trim, Replacing", page 92
- ⇒ "10.7.2 Bolted Decorative Trim, Replacing", page 96
- ⇒ "10.7.3 Rims with Bonded Wheel Trim", page 97
- ⇒ "10.7.4 Decorative Trim, Replacing, e-tron GT", page 97

10.7.1 Bonded Decorative Trim, Replacing

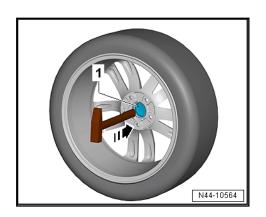
Special tools and workshop equipment required

◆ Cartridge Gun - V.A.G 1628-



◆ Trim Removal Wedge - 3409-







♦ Wiring Harness Repair Set - Hot Air Blower - VAS 1978/14A-



Materials

- ♦ One-Part Window Adhe- DH 009 100 A2sive
- LSE 020 100 A3-Silicone Remover

Decorative Trim, Removing



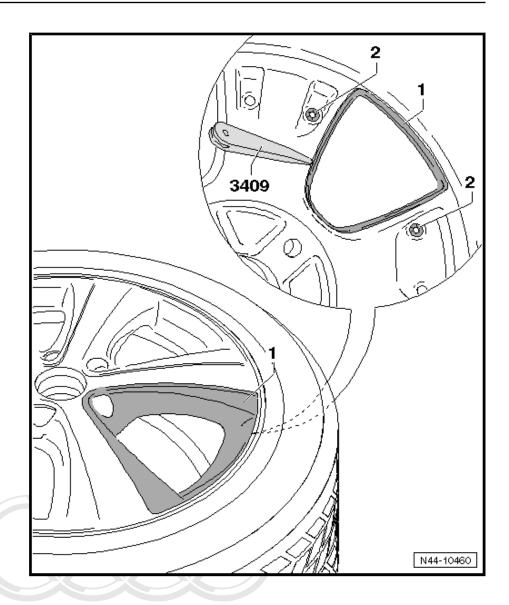
Note

It is not possible remove the decorative trim without damaging it.



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- Loosen the lock washers -2- from the inside of the light alloy
- Warm the decorative trim -1- from the outside using the Wiring Harness Repair Set - Hot Air Blower - VAS1978/14A- .



Note

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Do not overheat tires and light alloy wheels.

- Loosen the decorative trim -1- from the inside of the alloy wheel using the Trim Removal Wedge - 3409-.
- Grab under one corner from the outside and pull the decorative trim -1- off the light alloy wheel.



Note

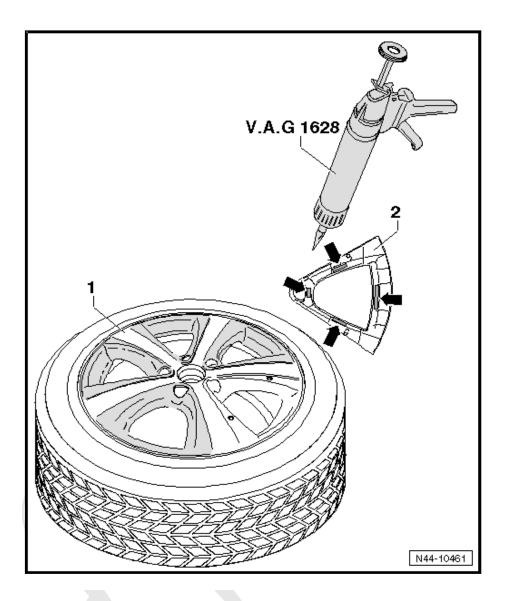
- The adhesive points for the PUR label are cut into the light alloy wheel.
- The remaining material serves as the adhesive base for the new decorative trim.
- The new decorative trim can be installed immediately.



Decorative Trim, Installing

These light alloy wheels are equipped with replaceable decoration elements. Note the following when installing.

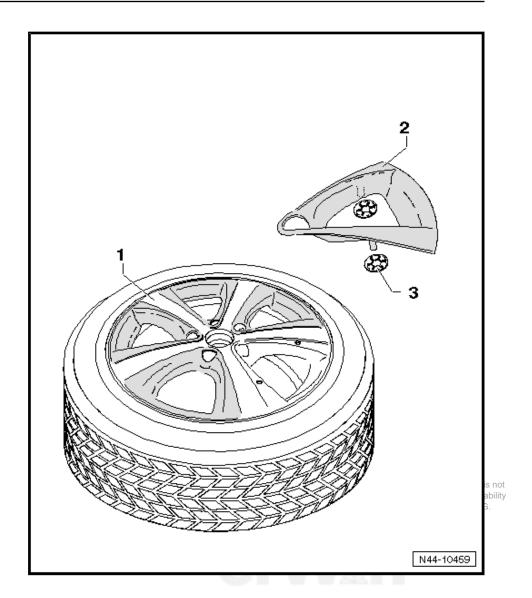
- Make sure the adhesion area on the light alloy wheels and decorative trim are free of dust and grease.
- Clean the adhesion areas with Silicone Remover LSE 020 100 A3-.



- Use the Cartridge Gun V.A.G 1628- to apply One-Part Window Adhesive DH 009 100 A2- on the adhesive surface -arrows-.
- Adhesive point: length = approximately 25 mm and diameter = approximately 10 mm

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- Press the decorative trim -2- into the light alloy wheels -1using firm pressure.
- Secure the decorative trim -2- to the inside of the light alloy wheel with lock washers -3-.

Minimum curing time: 3 hours at room temperature of minimum 15 $^{\circ}$ C (59 $^{\circ}$ F).

The light alloy wheel must be balanced again. Refer to ⇒
 <u>"5.12 Wheel, Balancing", page 35</u>

10.7.2 Bolted Decorative Trim, Replacing

The decorative trim may need to be changed after removing the wheel.

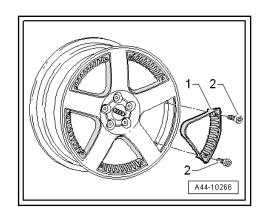
The decorative trim is only installed depending on the model.

These disc wheels are equipped with replaceable decoration elements. Note the following when installing.

 Clean the thread in the disc wheel before screwing in the new bolts.

- Always use new bolts!
- **Decorative Trim**
- Hex socket bolts

Tightening specification for self-locking hex socket bolts: 5 Nm



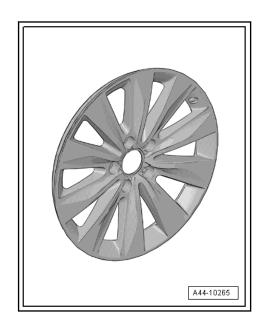
10.7.3 Rims with Bonded Wheel Trim

Be careful not to scratch off the bonded wheel trim on these rims.

The surface of the wheel trim is very sensitive.

The rim will have to be replaced if the wheel trim is damaged.

The wheel trim cannot be replaced.



10.7.4 Decorative Trim, Replacing, e-tron GT

- Clean the threads with compressed air.
- Check the threads for damage.
- Always use new bolts!

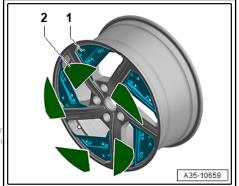
Only applies to 20 inch Aero

- Clip the decorative trim -2- into the carrier 1.

Only applies to 21 inch Aero and Show.

- Fasten the decorative trim -2- to the disc wheel.

- Protected by copyright. Copying for private or commercial purposes, in part or in whole, is 2.2 Nm forti24uinch Aero d by AUDI AG. AUDI AG does not guarantee or accept any liab rectness of information in this document. Copyright by AUDI AG.
- 3.5 Nm for 21 inch Show

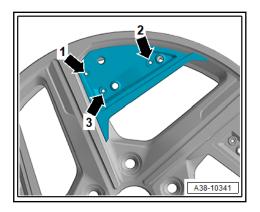


Fastening to carrier only for 20 inch Aero

- Tighten the bolts in sequence 1,2,3.

Torque

- 2.5 Nm
- Check all parts for correct and secure fit.





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10.8 Valve, Removing and Installing

⇒ "10.8.1 Valve Explanations", page 99

⇒ "10.8.2 Valve, Removing and Installing, Rubber Valve", page

⇒ "10.8.3 Valve, Removing and Installing, Metal Valve", page 100

Valve Explanations 10.8.1

1. Valve Body

- Valve Body
- Valve Insert
- Valve Cap

The rubber valve for tubeless tires is designed to seal air-tight in the hole in the rim. The elastic material of the rubber body presses itself tightly into the hole in the rim.

When valves with threaded metal feet are used, a rubber seal is used to seal the rim. The area around the edge of the valve hole is a sealing area. Therefore, they must be free of rust, dirt and damage.

2. Valve Insert

The valve insert has the most important job in the valve. It creates a seal and enables the regulation of the air pressure. The small plate seal on the valve core can only do its job when it is free of impurities, dirt and moisture. The compressed air system must be free of water and oil!

3. Valve Cap

A valve cap must always be screwed onto the valves. It prevents dirt from getting into the valve. Dirt which may be in the valve would reach the seal of the valve plate when the tire is inflated and cause a leak.

The valve must be replaced every time a new tire is fitted.

If the vehicle is driven without caps on the valves, there is the danger that dirt may get into the valve. This leads to gradual loss of air and therefore lead to the destruction of the tire:

- Separation of shell and rubber
- Wide circumferential grooves in the bead area.
- ◆ Torn-out tread or protector.

NOTICE

No air-tight seal due to an incorrectly tightened valve cap.

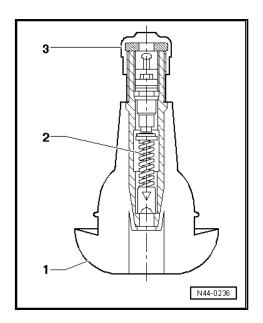
- Install the valve cap firmly on the copyright. Copying for private or commercial purposes, in part or in whole, is not ss authorised by AUDI AG. AUDI AG does not guarantee or accept any liability with respect to the correctness of information in this document. Copyright by AUDI AG.



Do not screw any aluminum valve caps onto steel valve bodies. Aluminum caps attach to the steel valve body into a inseparable connection and cannot be separated again.

Valve, Removing and Installing, Rub-10.8.2 ber Valve

Make sure wheel rim is clean.

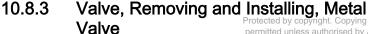


- Using the Valve Fitting Tool VAS 6459- -1-, insert a new tire valve.
- Remove the valve insert.
- Inflate the tire to approximately 3 to 4 bar (43.51 to 58.02 psi); the tire bead must slip audibly over the rim hump when doing this.
- Install the valve insert.
- Fill the tire to the specified pressure.



Do not screw any aluminum valve caps onto steel valve bodies. Aluminum caps attach to the steel valve body into a inseparable connection and cannot be separated again.

Balance the tire.



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Special tools and workshop equipment required

♦ Torque Wrench - V.A.G 1410-



N44-10348

Perform the following procedures:

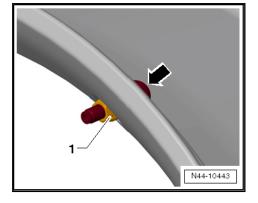
Removing

- Remove the Tire Pressure Monitoring Sensor.
- Remove the nut -1- from the metal valve.
- Counterhold -arrow- the metal valve using a retainer (for example 2 mm spiral bore) while doing so.

Installing



- Only apply the specified torque to tighten the nut for the
- Tightening more is not permitted because it damages the seal.

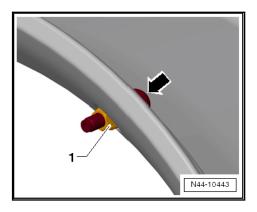




- Tighten the nut -1- of the metal valve.
- Counterhold -arrow- the metal valve using a retainer (for example 2 mm spiral bore) while doing so.
- Install the Tire Pressure Monitoring Sensor .
- Fill the tire to the specified pressure.



Do not screw any aluminum valve caps onto steel valve bodies. Aluminum caps attach to the steel valve body into a inseparable connection and cannot be separated again.





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11 Handling Problems

- ⇒ "11.1 Driving Noise", page 102
- ⇒ "11.2 Vehicle Pulls to One Side", page 104
- ⇒ "11.3 Vibration", page 109
- ⇒ "11.4 Flat Spots from Standing", page 111

11.1 **Driving Noise**

- ⇒ "11.1.1 Driving Noises, General Information", page 102
- ⇒ "11.1.2 Wear Spots", page 103

11.1.1 Driving Noises, General Information

Rolling noise perceived by the human ear is caused by vibrations transmitted from the noise source to the ear via the air.

Here we are interested in noises created by certain characteristics of the tires as well as the effects of rolling (noise source).

The cause for the noise generation depends primarily on the combination of road surface and tire.

The surface structure and material of the road surface also have a strong influence on the driving noise. For example, the noise level on a wet road is substantially higher than on a dry road.

The design of the tread has a great influence on the noise generation. Tires with cross grooves at an angle of 90° are louder than tires with grooves running diagonally.

Small tread blocks are unstable. Due to strong deformation, the air is excited by the rolling tires. Air vibrations occur, which will generate noises.

Wider tires are louder. They require more tread grooves for water displacement. Air is displaced by these tread grooves while rolling, which also cause air vibrations.

Other effects which also have an influence on noise generation:

- "Tire vibration" is the main cause of driving noise. The noise is generated by the excitation of the air column in the grooves.
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contact patch comes in contact with the road surface and the tread blocks are deformed.

Aid to reasoning of driving noise

Noise generation is created chiefly by tires and the road sur-

Influencing factors of road surface are roughness, structure and material.

Influencing factors for tires fall under different tire and rim widths. A wider tire generates more noise due to its wider contact patch than a narrower tire does, because more air is displaced and a greater "mass" is caused to vibrate.

A wider rim also causes the tire to have a wider contact patch. The effects on noise generation are basically the same as those of a wider tire. In addition, the noise suppression characteristics of the tire can, under certain circumstances, be negatively affected by the wider rim.



The tire rolling noise is significantly noticeable in the rear of vehicles with front engines, because wind and engine noise are less audible in the back.

Wear Spots 11.1.2

Wear spots are caused by a hard stop with locked wheels whereby the rubber compound is abraded from the contact sur-

When the tires slide across the road surface, frictional heat is generated which reduces the abrasion resistance on the tread compound.

Even the most abrasion resistant tread compound cannot prevent wear spots which can occur during extreme braking.

Even ABS cannot completely prevent brief locking and the resulting slightly flat spots.

The degree of abrasion is primarily dependent on the vehicle speed, road surface and tire load. For clarification see the following examples.

If a vehicle with locked front wheels is decelerated until it comes to a stop on a dry road surface, the rubber abrasion on the post card sized contact patch is approximately:

- from 57 km/h (35.4 mph) = 23.8 m (78.1 feet) braking distance, up to 2.0 mm,
- from 75 km/h (46.6 mph) = 41.8 m (137.1 feet) braking distance, up to 3.3 mm,
- from 92 km/h (57.2 mph) = 71.6 m (234.9 feet) braking distance, up to 4.8 mm.

Wear spots in tread

Tires with this type of damage cannot be used and must be replaced.

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11.2 Vehicle Pulls to One Side

- ⇒ "11.2.1 General Information", page 104
- ⇒ "11.2.2 Taper", page 104
- ⇒ "11.2.3 Corrective Action When Vehicle Pulls to One Side", page 105
- ⇒ "11.2.4 Targeted Rotating of Wheels for Non-Directional Tires", page 106
- ⇒ "11.2.5 Wheels, Targeted Rotating for Directional Tires", page 108

11.2.1 General Information

Perform a road test to determine if a vehicle pulls to one side and if so, when and to which side. If the vehicle pulls to one side.

If the vehicle alignment is measured, submit the measurement printout and the complaint report with the tire.

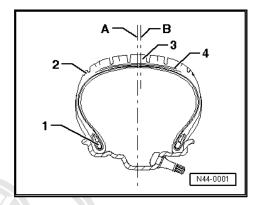
Manufacturer's tolerances can lead to taper in the tire construction. This results in a side force when the tire rolls, which acts directly on the suspension and can therefore lead to vehicle self-steering behavior. Targeted rotation of the wheels can balance out this self-steering behavior.

11.2.2 Taper

Taper is caused by slightly offsetting the tread and/or the belt by a few tenths of a millimeter from the geometric center of the tire. Taper cannot be recognized visually nor can it be measured with workshop equipment.

Components of a tire

- 1 Bead
- 2 Shoulder
- 3 Tread
- 4 Steel Belt
- A Geometric Center of Tire
- B Actual Position of Belt. It can be offset to inside or outside.





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Shown out of proportion to provide a better illustration.

- 1 Belt/Tread Offset
- F1 Unequal Wheel Forces
- F2 Unequal Wheel Forces
- Fk Force of Taper

The offset produces differences in rigidity of the inner and outer shoulders of the tire, which lead to differing forces on the wheel contact surface. Due to this, the belt and tread will not be pressed against the road surface with the same force (F1, F2). A taper forms. The resulting force (force of taper Fk) can become so large depending on speed, that the vehicle pulls to one side.

If the force (Fk) on one wheel of the axle is, for example, 50 Newton and on the other wheel also 50 Newton, and both forces are exerted in the same direction, the forces are additive. Reversing a tire on the rim can compensate for the pulling because the forces then act against each other.

Because the direction in which the force of taper is exerted is not visible at the tire, ronly road tests and targeted rotation of poses, in part or in whole, is not wheels and tires can establishes which sail and a land of the houling not guarantee or accept any liability which the builties of guarantee or accept any liability which the builties of months and convince by ALDLAG

The tire consists of numerous components and materials which are vulcanized to a single part at the end of a complicated manufacturing procedure. This leads to differing construction tolerances which can make themselves noticeable through more or less strong lateral forces (lateral forces of taper). These forces can also develop in new tires.

One-sided pulling on front axle

Pulling to one side can be caused by the suspension. However, experience shows that in 90% of all complaints, the tires cause pulling to one side.

One-sided pulling during normal driving style

On a straight, level road surface, the vehicle wants to pull to one side at a constant speed or with moderate acceleration. At the same time force can be felt at the steering wheel.

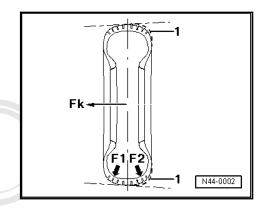
One-sided pulling during strong accelerating

Pulling to one side during fast acceleration is, in part, due to the design of vehicles with FWD. Various frictional conditions of left and right wheels, for example, possible irregularities in the road surface (pot holes) and consequently varying adhesion to ground have a substantial influence on the handling characteristics. This does not constitute a complaint in the sense of the warranty.

11.2.3 Corrective Action When Vehicle Pulls to One Side

Test conditions before and during the road test

- Check all suspension components on front and rear axle for damage.
- Check tire pressure and correct if necessary.
- Check the tires for external damage. Holes, cuts, bulges in the side wall, flat spots from braking and/or damage to the
- Ask the customer if a tire had been damaged by a nail or similar object and perhaps repaired by a tire dealer. Such tires may have to be replaced.



- Check tires for even wear and tread depth.
- Are all tires of the same type, manufacture and tread pattern?
- If the tires are non-directional, ensure that all DOT classifications on the tire face outwards. It may be that the vehicle's wheels and tires were already changed around at an earlier date.
- Are the tire brands factory recommended as initial equip-
- For the road test, use a level, straight driving surface that does not slope off to one side and does not have ruts.
- Perform the road test with the customer under the conditions specified above. The customer should demonstrate the problem.



Note

There should not be any crosswind when road test takes place.

If the complaint is justified, it is recommend to rotate the wheels and tires as described on the following pages.

Before beginning, observe the following notes, otherwise all effort will be for nothing!



Note

- Mark tires/wheels before the first rotation, for example LF. RF, LR, RR.
- After rotating wheels or reversing the tire on its rim, observe very carefully how the vehicle behaves during the road test. Note what was replaced and how.
- The intensity or any possible change to the one-sided pulling should be assessed.
- To do this, it is absolutely essential that the road tests are always performed by the same person on the same road. It whole, is not is best to drive the reserved by AUDI AG.
- Replacing a tire with a new tire does not guarantee that pulling to one side will be eliminated. Therefore, it is recommended to perform a targeted exchange of the wheels as described below.
- If there are large differences in the tread depth of the tires on the front and rear axles, the tires with the deeper tread should always be mounted on the rear axle.

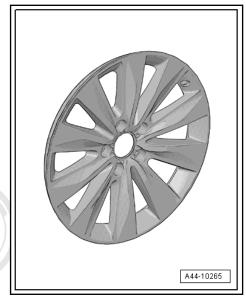
11.2.4 Targeted Rotating of Wheels for Non-**Directional Tires**

Be careful not to scratch off the bonded wheel trim on these

The surface of the wheel trim is very sensitive.

The rim will have to be replaced if the wheel trim is damaged.

The wheel trim cannot be replaced.



Perform	Perform a road test to determine if a vehicle pulls to one side and if so, when and to which side					
renorm a road test to determine if a verticle pulls to one side and it so, when and to which side						
	If the vehicle pulls to one side, swap the front wheels.					
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with respect to the correctness of information in this document. Copyright by AUDI AG. **Road Test, Performing**						
Vehicle travels straight - END						
Vehicle pulls opposite		Vehicle pulls to the same side				
	↓	↓ ↓				
Reverse one tire on its rim on the front axle (reverse the direction of travel)		Rotate wheels from front to back				
,		↓				
	Road Test, Performing	Road Test, Performing				
Vehicle travels straight - END		Vehicle travels straight - END				
Veh	nicle does not travel straight	Vehicle does not travel straight				
	↓		↓			
Swap fro	nt wheels and swap back wheels	Vehicle pulls opposite	No change			
	↓	↓	↓			
Road Test, Performing		Reverse one tire on its rim on the front axle (reverse the direction of travel)	Check alignment of front and rear axles, adjust if necessary.			
Ve	hicle travels straight - END		If adjustment is correct, inform Product Support.			
Veh	nicle does not travel straight					
	↓					
Swap the front wheels						
	1	↓				
Road Test, Performing		Road Test, Performing				
Vehicle trav- els straight - END	Vehicle does not travel straight	Vehicle travels straight END				
	Ţ	Vehicle does not travel straight				

Q	Q)
_	_	

Install new tires on front axle	Install new tires on front axle	
<u> </u>	1	
Road Test, Performing	Road Test, Performing	
Vehicle travels straight - END	Vehicle travels straight - END	
↓	↓	
Vehicle does not travel str	raight, inform Product Suppo	ort

Wheels, Targeted Rotating for Direc-11.2.5

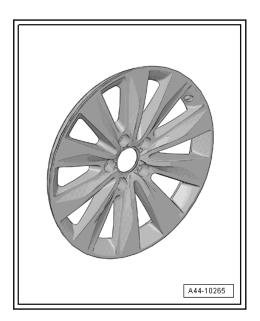
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Be careful not to scratch off the bonded wheel trim on these

The surface of the wheel trim is very sensitive.

The rim will have to be replaced if the wheel trim is damaged.

The wheel trim cannot be replaced.



↓		
Perform a road test to determine if a vehicle pulls to one side and if so, when and to which side		
↓		
If the vehicle pulls to one side, swap wheel with tire front and back.		
↓		
Road Test, Performing		
Vehicle travels straight - END		
Vehicle does not travel straight		
↓		
First, replace one tire on the front axle		
↓		
Road Test, Performing		
Vehicle travels straight - END		
Vehicle does not travel straight		
↓		
Replace second tire on the front axle		



\downarrow	
Road Test, Performing	
Vehicle travels straight - END	
Vehicle does not travel straight	
\downarrow	
Measure vehicle at front and back	
↓	
Road Test, Performing	
Vehicle travels straight - END	
Vehicle does not travel straight, inform Product Support	

11.3 Vibration

⇒ "11.3.1 Vibration Causes", page 109

⇒ "11.3.2 Vibration, Road Test, Performing Before Balancing", page 109

⇒ "11.3.3 Vibration, Vibration Control System", page 110

11.3.1 Vibration Causes

There are many causes for vibration. Vibration can also be caused by tire wear, among other things. Tire wear caused by driving does not always develop evenly over the entire tread. Due to this, a slight imbalance develops which disturbs the smoothness of the formerly accurately balanced wheel.

This slight imbalance cannot yet be felt in the steering wheel, but it is present. It increases the tire wear and consequently permission by copyright. Copyring for buyate of continuencial purposes, in part of in whole, is not permission by copyright of the titles not guarantee or accept any liability with respect to the correctness of information in this document. Copyright by AUDI AG.

Recommendation

In order to guarantee over the entire service life of a tire

- optimal safety,
- optimal smoothness and
- uniform wear

It is recommended that wheels/tires be balanced at least two times within the tire's service life.

Another reason for vibrations can be flat spots from standing. Refer to ⇒ "11.4 Flat Spots from Standing", page 111 .

Vibration, Road Test, Performing Be-11.3.2 fore Balancing

If a vehicle comes to the workshop with the complaint "vibration", a road test must be performed before balancing the wheels.



Personal risk and risk for other drivers while test driving.

- Always observe the local applicable law.
- Secure testing equipment.
- That way, information about the type of vibration can be obtained.

- Observe at which speed range the disturbance takes place.
- Raise the vehicle on the platform immediately after the road
- Mark the component location on the tire.

Component location of tire	Identification with
Left front tire	LF
Right front tire	RF
Left rear tire	LR
Right rear tire	RR

- Remove the wheels from the vehicle.
- Balance the wheels.

Vibration, Vibration Control System 11.3.3

Expanded functions can be performed using Hunter RFT33VAG Road Force Touch™ Wheel Balancer - VAŠ 6230 B4- in addition to the previously known balancers.

A special characteristic of this system is testing the radial force of wheel/tire during rolling.

For this purpose, a roller presses a force of approximately 635 kg (1,399.93 lbs) against the wheel. This simulates the tire contact force against the road surface while driving.

Tire contact forces fluctuate due to radial and lateral run-out and differing stiffness in the tires.

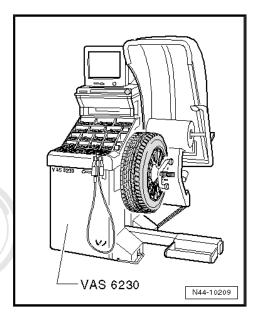
The -VAS 6230 B4- detects and stores the position of the maximum measured radial force in the tires. After that, the position of smallest dimension between rim flange and disc wheel center is measured.

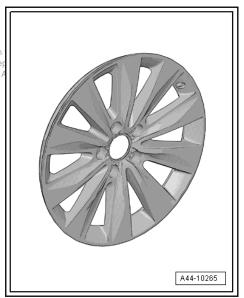
Be careful not to scratch off the bonded wheel trim on these

The surface of the wheel trim is very sensitive.

The rim will have to be replaced if the wheel trim is damaged.

The wheel trim cannot be replaced.







11.4 Flat Spots from Standing

Another reason for vibrations can be flat spots from standing.

⇒ "11.4.1 Causes of flat spots from standing:", page 111

⇒ "11.4.2 Flat spots, correcting", page 111

11.4.1 Causes of flat spots from standing:

What is a flat spot from standing?

Terms like flat area, flattening, are also used as a term for flat spots from standing.

It is important to recognize a flat spot in the tread from standing as such!

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Flat spots from standing can occur at any time due to various circumstances. Flat spots from standing can be corrected without complex special tools. Providing that the wear spot was not caused by wheel lock during hard braking.



Note

Wear spots due to wheel lock are irreparable! Tires with such damage must be replaced.

Causes of flat spots from standing:

- The vehicle stands for a long period of time in the same location without being moved.
- Tire pressure is too low.
- The vehicle was placed in a paint system drying cabinet after painting.
- The vehicle was parked with warm tires in a cold garage or similar for a long time. In this case, a flat spot can develop overnight.

11.4.2 Flat spots, correcting

A flat spot from standing cannot be balanced.

- Flat spots cannot be removed from tires with workshop equipment.
- Such flat spots can be "driven out" only by driving the car until the tires are warm.
- We do not recommend the following method during cold or winter weather.

Requirements/Conditions

- Check the tire pressure and correct, if necessary.
- If possible, drive the vehicle on an expressway.
- If the traffic and road conditions permit, drive at a speed of 120 km/h to 150 km/h (74.6 mph to 93.2 mph) for a distance of 20 to 30 km (12.4 to 18.6 miles).



NOTICE

Personal risk and risk for other drivers while test driving.

- Always observe the local applicable law.
- Secure testing equipment.
- Lift the vehicle immediately after the performing the road test.
- Remove the wheels from the vehicle.
- Balance the wheels on the stationary balancing machine.





12 Tire Evaluation / Tire Damage

- ⇒ "12.1 Flat Spots from Standing", page 113
- ⇒ "12.2 Cracking", page 113
- ⇒ "12.3 Heel and Toe Wear", page 114
- ⇒ "12.4 Wear Spots", page 115
- ⇒ "12.5 Tire Sidewall Swelling", page 116
- ⇒ "12.6 Cuts", page 117
- ⇒ "12.7 Foreign Object Damage", page 117
- ⇒ "12.8 Disintegrated Tread", page 118
- ⇒ "12.9 Tires, Damage from Low Tire Pressure", page 118
- ⇒ "12.10 Inspecting Tires", page 118
- ⇒ "12.11 Mounting Damage", page 120

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- the legal minimum tread depth of 1.6 mm is reached,
- there is visible damage from mechanical damage,

12.1 Flat Spots from Standing

Suspension shaking and tire damage can also be caused by flat spots from standing. Refer to ⇒ "11.4 Flat Spots from Standing", page 111.

What is a flat spot from standing?

Terms like flat portion, flattening, are also used as a term for flat spots from standing.

Flat spots from standing cause vibration, like an incorrectly balanced wheel. It is important to recognize a flat spot in the tread from standing as such!

Flat spots from standing cannot be corrected by balancing, and can occur again at any time under various circumstances. Flat spots from standing can be corrected without complicated special tools. Providing that the wear spot was not caused by wheel lock during hard braking.



Note

Wear spots due to wheel lock are irreparable! Tires with such damage must be replaced.

Refer to ⇒ "11.4.2 Flat spots, correcting", page 111

12.2 Cracking

Cracking is the term for shallow cracks in the sidewall of the

They run starting from the bead in the direction of the tire shoul-

The cause is the increase in material at the joints of the tire components.

Cracking has no effect on

- safety,
- service life,
- vehicle handling
- other characteristics of the tire.

Cracks can be of varying visibility, removing the tire from the rim or an examination is not necessary.

How did the cracks form?

Modern steel belted tires are constructed with simple in States or commercial purposes, in part or in whole, is not walls to save weight walls to save weight. with respect to the correctness of information in this document. Copyright by AUDI AG

The sidewall components consist of long strips before they are joined together to form a tire. They must overlap at the material joints. Small irregularities/ripples form in the area of the overlapping components. The overlaps are easier to see from the outside due to the single-ply construction.

Heel and Toe Wear 12.3



Note

A heel-and-toe wear also influences the service life and the driving noise of tires. Refer to ⇒ "13 Tire Wear", page 121.

A heel-and-toe wear is step-like wear of individual tread blocks (see image), which can cause increased driving noises. The heel-and-toe wear is caused by the uneven distortion of the tread blocks in the contact patch. Heel-and-toe wear appears in more extreme forms on non-tractive wheels than on tractive wheels.

New tires have a stronger tendency to heel-and-toe wear, because the high tread blocks have greater elasticity. As tread depth decreases, the rigidity of the tread blocks increases and the tendency to heel-and-toe wear decreases.

What does heel-and-toe wear look like?

The tread lugs are seen in the running direction and are higher in the front than in the back; see image. Extreme heel-and-toe wear may lead to customer complaints about noise.

Increased heel-and-toe wear occurs with:

- Toe values too great
- Incorrect air pressure
- Deep, open treads
- Tires which are not mounted on the driven axle
- Extreme driving style around curves
- 1 Tread block, heavy wear at start of tread block
- 2 Running Direction

Non-directional tires:

When heel-and-toe wear occurs, the direction of travel of the tire must be reversed. If increased heel-and-toe wear and rolling noise develop, the tires should be rotated diagonally. This leads to a reduction of heel-and-toe wear. On vehicles with FWD, this effect is increased by increased wear on front axle. The tire noise is somewhat louder immediately after rotating the wheels, but the normal noise level will return after traveling approximately 500 to 1,000 km (310.7 to 621.4 miles).

Directional tires:

In the event of increased heel-and-toe wear of the tires on the rear axle - most common with FWD - rotate the wheels from back to front. In the event of increased heel-and-toe wear on the outer edges on one axle, reverse both tires on their rims. Then the left wheel must be mounted on the right side and the right wheel on the left side.

Heel-and-toe wear is a normal wear pattern and is reduced on non-directional tires by diagonal rotation of the tires after approximately 500 - 1,000 km (310.7 - 621.4 miles).

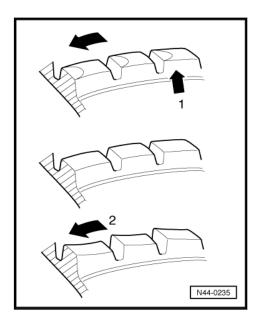
The preceding repair attempt is to be briefly described on the complaint report.

The modern tire construction is designed for the highest driving safety as well as when the roads are wet. Heel-and-toe wear is reduced by to the necessary open tread design in the tire sidewalls and the smoother tread compound.

Heel-and-toe wear is not a fault in terms of warranty, but rather a completely normal wear pattern.

12.4 **Wear Spots**

- A wear spot is a flat spot on the tread of the tires that can be caused by extreme braking maneuvers on subsurface such as asphalt.
- At the same time a tire during the braking maneuver is rubbed at selective points which causes a tire imbalance.
- The consequences of a wear spot is strong vibrations in the vehicle, which can lead to a worsening of the driving permittee havior and a higher noise generation has a accept any liability
 - In most cases the tire tends to lock up due to the larger running surface at this location even with a slightly reduced braking effect leading to an increase in the vibrations.
 - Only for low intensity wear spots can the vibrations disappear after a short time through further wear on the tire.



NOTICE

Wear spots on tire with irreparable damage due to extreme braking maneuvers.

Replace the tire.

12.5 Tire Sidewall Swelling

A swelling in the flank of the tire indicates that the substructure of the shell has been damaged.

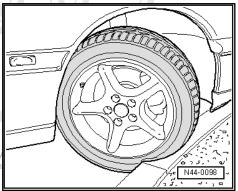
Typical causes for such damage include, for example, driving over curbs at a sharp angle.

Pinching the shell of a tire this way can damage the carcass.

The substructure of the tire is stretched so far that individual fibers in the shell may break.

The extent of the damage depends on the speed of impact, the angle of impact, the air pressure, the axle load and the type of obstacle.

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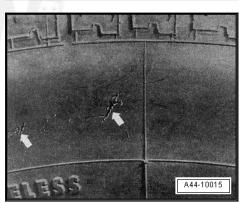


Evidence of pinching on the sidewall of a tire -arrows-



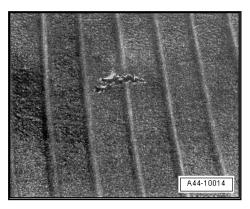
Note

- Driving over curbs must be avoided!
- When it cannot be avoided, curbs should be driven over very slowly at the bluntest possible angle.



Interior view of a tire with a punctured shell.

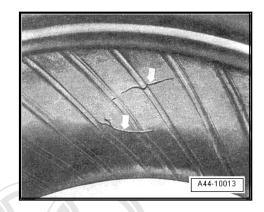
Due to a severe impact, the shell was pinched on the rim flange and is ruptured in the contact area.





Inside tire damage due to impact damage (double rupture)

Double rupture -arrows- caused by pinching when driving over a curb. Often not detectable from outside.



12.6 Cuts

Cut caused by a sharp-edged obstacle -arrow-.

Only trained personnel can decide if a cut destroyed the tire.



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12.7 Foreign Object Damage

Driving over hard, pointed objects like nails, screws and the like can pierce the tire.

This always leads to tire damage.

Damage from embedded foreign bodies

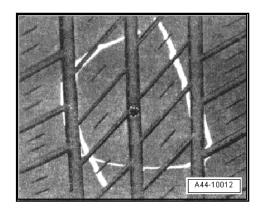
Frequently, the foreign object -marking- is so securely embedded in the tire that it will not free itself even at higher speeds. Due to this, it can act as a plug and seal the tire relatively well. The result is gradual loss of pressure which the driver does not notice immediately but which can lead to sudden and complete tire failure.



Note

No repair should be attempted on steel belted tires of which the structure has been punctured by a foreign object.

Only trained personnel can decide if a foreign object destroyed the tire.



12.8 Disintegrated Tread

Tires with torn-out tread

Such damage usually develops over a longer period of time. If an already damaged tire is exposed to high stress, the centrifugal force at higher speeds can tear components off the tire.

The illustration shows a tire with torn-out tread due to driving with insufficient tire pressure.



12.9 Tires, Damage from Low Tire Pressure

The most common causes of failure are small external damage, a defective valve or a leaky rim due to corrosion or damage.

Separation of shell and rubber

Strong heating due to driving with substantially insufficient pressure led to overheating and subsequent separation of shell from rubber material -arrows-.

The tire shown here was sporadically driven with tire pressure insufficient for the load. Typical indications for this are the circumferential abrasions in the area of the bead caused by the rim flange and the discoloration. Small, furrowed folds are visible along the inner sidewall.

When the tire rolls, strong shear forces develop between the steel belt layers, especially at the ends of the belts.



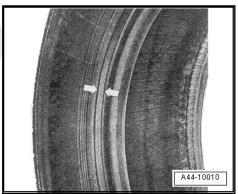
Tires with wide grooves along the circumference in the area of the bead

Wide grooves along the circumference in the area of the bead -arrows- indicate that the tire was driven with insufficient air pressure.

Driving a vehicle with insufficient tire pressure or ignoring or not recognizing tire damage can have serious consequences.

The tire can no longer withstand the forces developing during travel.

The function of the tire is limited by the defects mentioned above. The rubber compounds separate from one another, resulting in partial separation of tire components up to complete part or in w permitted unless authorised by AUDI AG. AUDI AG does not guarantee or accept any liability with respect to the correctness of information in this document. Copyright by AUDI AG. destruction.



12.10 Inspecting Tires



Note

Tires must be checked by trained personnel.

Because tire damage can have serious consequences, the technician and the driver should regularly check the tires, as it is the best form of early problem recognition.

Pre-damaged tires cannot withstand driving situations like high vehicle speed, long driving distance, sporty driving style and similar situations.

Damage can occur from various causes:

- Driving with low tire pressure
- Mistakes during tire mounting
- Damage impact damage
- Aging
- Incorrect storage

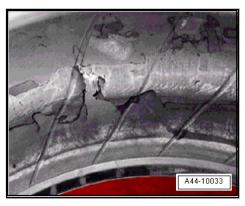


Note

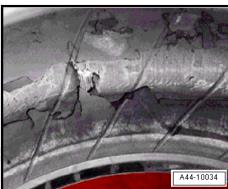
As soon as a safety risk cannot be ruled out, the tire must be replaced.

Pay special attention to the following criteria when examining the tire:

- Surface erosion or marbling on the inner side (pressure was too low or insufficient for the load)
- Detached rubber or loose cords



Exposed or deformed bead bundle



Damage to tire bead with visible cords



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12.11 Mounting Damage



Note

Tires must be removed and installed by trained personnel.

Bundle broken during tire inflation.

Modern radial car tires are mounted only on safety rims. These have a hump -1- running along the shoulders.

- 1 Hump (H2)
- 2 Inner Bead Seat
- 3 Rim
- 4 Wheel Disc
- 5 Outer Bead Seat

The hump prevents the tire from being pressed out of the bead seat during travel with insufficient tire pressure.

When the tire is inflated, the tire bead may not slip completely over the outer rim hump.

In this case, there is the danger that the bead bundle will be overstretched if the tire pressure is too high and the steel wires rupture partially or completely. Torn bundles are often not detectable from outside.

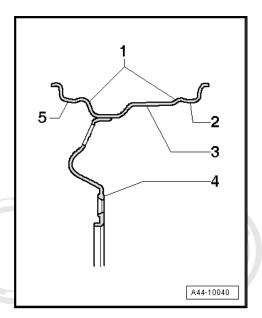


CAUTION

Damaged tire bead core.

No secure fit for the tire on the rim.

Replace the tire.





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13 **Tire Wear**

- ⇒ "13.1 Tire Service Life, Influences", page 121
- ⇒ "13.2 Heel and Toe Wear", page 122
- ⇒ "13.3 High Speed Tires, Wear Characteristics", page 122
- ⇒ "13.4 Tread Depth, Measuring", page 123
- ⇒ "13.5 Tire Wear, One Sided", page 123
- ⇒ "13.6 Tire Wear, Outer Shoulder", page 126
- ⇒ "13.7 Diagonal Flattening", page 127
- ⇒ "13.8 Tire Wear, Center", page 127
- ⇒ "13.9 Permitted Differences in Tread Depth", page 128

13.1 Tire Service Life, Influences

The following factors influence the service life of a tire in varying degrees.

Driving style:

- ♦ Speed
- Braking
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- Acceleration authorised by AUDI AG. AUDI AG does not guarantee or accept any liability with respect to the correctness of information in this document. Copyright by AUDI AG.
- Cornering

Service:

♦ Tire Pressure

Area:

- Paving
- Exterior temperature/climate

Vehicle:

- ♦ Weight
- ◆ Dynamic toe and camber values

Tire operating conditions

- Speed range
- ♦ Wet or dry

Tire construction:

Winter/summer

Changes to the suspension:

If a "lowering-kit" and /or light alloy wheels from accessories which have not been approved by the vehicle manufacturer are used, wheel alignments which deviate from the alignment specified in design may occur during travel.

Even if the adjustment of the axle geometry measured on a standing vehicle is correct, changes in the body height and positions of the wheels during travel can lead to changes to the paths of travel of the suspension.

For this reason, uneven wear is pre-programmed.

13.2 Heel and Toe Wear

Heel-and-toe wear is step-like wear of individual tread blocks, due to which an increased rolling noise can develop. The heeland-toe wear is caused by the uneven distortion of the tread blocks in the contact patch. Heel-and-toe wear appears in more extreme forms on non-tractive wheels than on tractive wheels.

New tires have a stronger tendency to heel-and-toe wear, because the high tread blocks have greater elasticity. As tread depth decreases, the rigidity of the tread blocks increases and the tendency to heel-and-toe wear decreases.

Appearance of heel-and-toe: wear. Copying for private or commercial purposes, in part

A - Tread blocks of a new tire viewed in direction of travelment. Copyright -arrow 1-, tread blocks have the same height in front and rear.

B - Heel-and-toe wear; viewed in direction of travel -arrow 1-, the tread blocks are higher in front than in rear -arrow 2-.

C - Viewed in direction of travel -arrow 1-, tread blocks exhibit significant wear in forward area of "heel-and-toe wear" -arrow 3-.

Extreme heel-and-toe wear may lead to customer complaints about noise.

Increased heel-and-toe wear occurs with:

- Toe values too great
- Incorrect air pressure
- Deep, open treads
- Tires which are not mounted on the driven axle
- Extreme driving style around curves.

Non-directional tires

When heel-and-toe wear occurs, the direction of travel of the tire must be reversed. If increased heel-and-toe wear and rolling noise develop, the tires should be rotated diagonally. This leads to a reduction of heel-and-toe wear.

On vehicles with FWD, this effect is increased by increased wear on front axle.

The rolling noise is somewhat louder immediately after rotating the wheels, but the normal noise level will be reached after traveling approximately 500 to 1,000 km (310.7 to 621.4 miles).

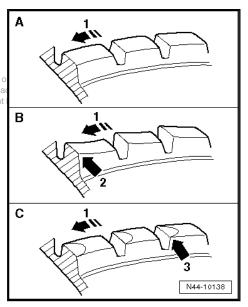
Directional tires

In the event of increased heel-and-toe wear of the tires on the rear axle - most common with FWD - rotate the wheels from back to front. In the event of increased heel-and-toe wear on the outer edges on one axle, reverse both tires on their rims. Then the left wheel must be mounted on the right side and the right wheel on the left side.

13.3 High Speed Tires, Wear Characteris-

These tires are designed for the highest speeds. Good traction on wet roads is emphasized when developing these tires. Tread compounds do not have the abrasion resistance of tires for lower speeds, such as T and H tires.

Therefore the service life expectancy of high-speed tires is substantially lower under comparable operating conditions.





13.4 Tread Depth, Measuring

For this, pay attention to the running surface depth differences. Refer to ⇒ "13.9 Permitted Differences in Tread Depth", page



Note

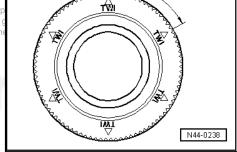
- When measuring tread depth, take measurements in the main grooves.
- Do not take measurements at the tread wear indicator.

Tread depth of a tire must be measured in the main grooves at the points showing the most wear. The positions of the tread wear indicators are marked along the tire shoulder.

In place of "TWI", there may also be as \(\Delta\) in company embias of does not with respect to the correctness of information in this docum blem".

The TWI protrusions are 1.6 mm tall. This is the minimum tread depth legally prescribed in Germany.

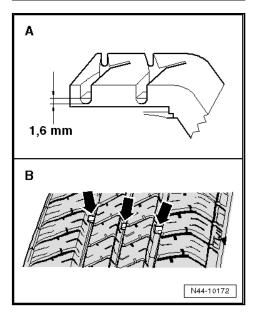
Different values may apply in other countries.



60°

Tread Wear Indicators (TWI) must not be included in the measurement. The deepest point of the groove must be used for the measurement.

- A Tread Wear Indicators in Main Tread Grooves
- B Main Grooves with Tread Wear Indicators -arrows-



13.5 Tire Wear, One Sided

In many causes, this is caused by driving style, but sometimes it is also caused by incorrect axle adjustment.

Increased one-sided wear

One-sided wear, in conjunction with scrub marks on tread ribs and finer grooves, always appears when tires roll at an extreme tire slip angle and consequently »scrub« on the road surface.

Driving quickly around curves leads to increased wear, especially on the outside edge.

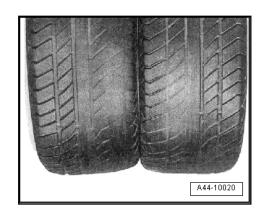
A rounded tire shoulder in conjunction with especially high wear on the outer tread bars indicates fast driving around curves. This wear pattern is influenced by the driving style.

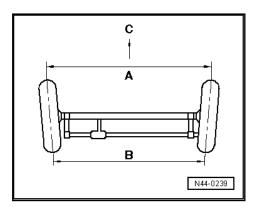
The suspension is adjusted to certain toe and camber values to optimize driving behavior. When tires roll under conditions other than those specified, increased and one-sided wear must be expected.

Strong one-sided wear can be caused especially by incorrect toe and camber values. This increases the danger of diagonal hole, is not wear spots mitted unless authorised by AUDI AG. AUDI AG does not guarantee or accept any liability wear spots with respect to the correctness of information in this document. Copyright by AUDI AG.

Toe-out or negative toe-in value

The distance between the fronts of the tires -A- is greater than the distance between the backs of the tires -B- (-C- = direction of travel).







Toe-in or positive toe-in value

The distance between the fronts of the tires -A- is less than the distance between the backs of the tires -B- (-C- = direction of travel).

To avoid one-sided tire wear, ensure that the wheel alignment remains within the tolerances specified by the vehicle manufacturer. The most common deviation of wheel alignment is caused by external influences, for example hard contact with the curb when parking.

A measurement of the axle geometry can determine whether the wheel alignment is within the specified tolerances or whether a correction of the wheel alignment is necessary.

Changes to the suspension

If a "lowering-kit" and /or light alloy wheels from accessories which have not been recommended by the vehicle manufacturer are used, wheel alignments which deviate from the alignment specified in design may occur during travel.

Even if the adjustment of the axle geometry measured on accept any liability standing vehicle is correct; changes in the body height and by AUDI AG. positions of the wheels during travel can lead to changes to the paths of travel of the wheel suspension.

For this reason, uneven wear is pre-programmed.

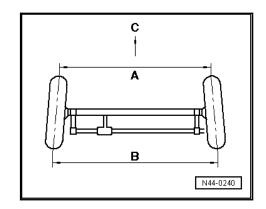
Improper use of air suspension height adjustment

The use of off road levels is only recommended when driving off road. The permanent use of off road levels on normal roads can lead to increased tire wear because the changed height changes the wheel alignment relative to the road level.

To prevent one-sided tire wear, correct axle geometry adjustment should be ensured on the one hand, and intended use of the vehicle on the other hand.

Good vehicle and tire maintenance helps to prevent tire wear. The following points should especially be observed.

- The specified minimum tire pressures must be maintained.
- Different wear on front and rear axle cannot be avoided depending on driving style. This can be counteracted by regular tire rotation. This lends itself, for example, to the rotational change from summer to winter tires and back. This change has the positive side effect of all tires wearing evenly so a complete set of new tires can be installed. This prevents use of different tire tread depths on both axles. which can have negative effects on driving behavior.
- The formation of heel-and-toe wear is a normal wear pattern, particularly with a very smooth driving style. This could result in a louder rolling noise which are generally improved with increased tread depth. If heel and toe wear is light or is still forming, rotating the tires from one axle to the other is generally sufficient. With strong heel-and-toe wear, tires should be rotated according to so that their direction of travel is reversed. This does not apply to non-directional tires!
- On some tire profiles, the effect of premature wear can be detected visually: If winter tire ribs or profile recesses have been worn off, only compact tread block without tread pattern, which gives the impression of a worn tire. In this case, the remaining profile depth in each tread groove must be measured. If it is greater than the legally required minimum tread depth (Germany 1.6 mm; it is recommended to use winter tries with a remaining profile of 4 mm only in summer



use [regulation in Austria]), the tires can be reused without restrictions.

13.6 Tire Wear, Outer Shoulder

Improper use of air suspension height adjustment

The use of off road levels is only recommended when driving off road. The permanent use of off road levels on normal roads can lead to increased tire wear because the changed height changes the wheel alignment relative to the road level.

To prevent one-sided tire wear, correct axle geometry adjustment should be ensured on the one hand, and intended use of the vehicle on the other hand.

Good vehicle and tire maintenance helps to prevent tire wear. The following points should especially be observed.

- The specified minimum tire pressures must be maintained.
- Different wear on front and rear axle cannot be avoided depending on driving style. This can be counteracted by regular tire rotation. This lends itself, for example, to the rotational change from summer to winter tires and back. This change has the positive side effect of all tires wearing evenly so a complete set of new tires can be installed. This prevents use of different tire tread depths on both axles, which can have negative effects on driving behavior.
- The formation of heel-and-toe wear is a normal wear pattern, particularly with a very smooth driving style. This could result in a louder rolling noise which are generally improved with increased tread depth. If heel and toe wear is light or is still forming, rotating the tires from one axle to the other is generally sufficient. With strong heel-and-toe wear, tires should be rotated according to so that their direction of travel is reversed. This does not apply to non-directional tires!
- On some tire profiles, the effect of premature wear can be detected visually: If winter tire ribs or profile recesses have been worn off, only compact tread block without tread pattern, which gives the impression of a worn tire. In this case, the remaining profile depth in each tread groove must be measured. If it is greater than the legally required minimum tread depth (Germany 1.6 mm; it is recommended to use winter tries with a remaining profile of 4 mm only in summer use [regulation in Austria]), the tires can be reused without restrictions.







13.7 **Diagonal Flattening**

Diagonal flattening on tires

Diagonal flattening runs at an angle of approximately 45° with respect to the plane of circumference.

They usually occur once, but may also occur several times along the tire circumference.

Wear spots appear almost exclusively on the non-tractive tires, especially the rear left tire. There are vehicle models where wear spots appear rounded, which are not a problem. The effect is increased by high toe values. Toe values at the lower tolerance limit of the specified value improve the wear pattern.

The tire component integration is often found in the area with the most pronounced diagonal flattening.

Wheels with toe-in roll with a slip angle even when the vehicle is traveling straight ahead. This leads to diagonal tension in the contact zone between tires/road surface.

Driving with reduced tire pressure will improve the wear pattern. To prevent such wear patterns, the toe values of both rear wheels should be the same and the specified tire pressure should be maintained.

If wear spots are detected, mount the wheels on the tractive axle if the wear spots are still in the initial stage. Deeper wear spots are irreparable.

Faulty adjustment

When a customer complains of "diagonal flattening", the toe adjustment must be checked. If it is OK, the cause for the diagonal wear spots is most likely in the tires.

Tires with diagonal wear spots which developed due to faulty adjustment of the axle geometry are excluded from the warranty.

13.8 Tire Wear, Center

This wear pattern is found on drive wheels on high-powered vehicles that often drive long stretches at high speed.

At high speeds, the centrifugal force increases the tire diameter at the center of the tread more than at the shoulders of the tire. The drive forces from the center area of the tread are transferred to the road surface. This is reflected in the wear pattern.

These effects can appear especially extreme on wide tires.

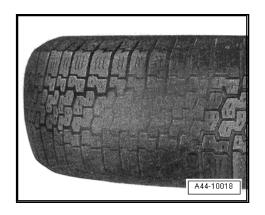
part or in whole, is not Reducing the tire pressure is not an effective remedy for this accept any liability wear pattern with respect to the correctness of information in this document



Note

For safety reasons, tire pressure must never be lowered below specified pressure under any circumstances.

A largely even wear pattern can be achieved if tires are changed in a timely manner from the driven to the non-driven axle.



Increased tread wear

Typical wear pattern of tires on the driven axle of high-powered vehicles.

The increased wear at the tread center is caused by stresses related to the centrifugal force of the tire and the transmission of traction forces.



13.9 Permitted Differences in Tread Depth

⇒ "13.9.1 Models with Vertically Installed Engine", page 128

⇒ "13.9.2 Models with Horizontally Installed Engine", page 128

- For all four wheels use only tires of the same construction type, and tread.
- Replacing one individual tire is always possible. However, Audi recommends at the very least that the tires are replaced on both sides of the axle.
- With sport differential on the rear axle, Audi recommends always replacing the tires on both sides of the rear axle.



The technical background of the limitations are thermal preservited by copyright. Copying for private or commercial purposes, in part or in whole, is not succept any liability sure for the transmission oil due to a large difference in the with respect to the correctness of information in this document. Copyright by AUDI AG. rolling circumference of the tires.

13.9.1 Models with Vertically Installed Engine

Here the average difference between the front and rear axle should not be more than 2 mm.

Average at front axle 3.0 mm

Average at rear axle 4.5 mm

Difference of front axle to rear axle 1.5 mm

Within the tolerance of 2 mm.

13.9.2 Models with Horizontally Installed Engine

Here the average difference between the front and rear axle should not be more than 3 mm.

Average at front axle 2.0 mm

Average at rear axle 4 mm

Difference of front axle to rear axle 2 mm

Within the tolerance of 3 mm.





Component Overview 14

⇒ "14.1 Component Overview - Alloy Wheel", page 129

⇒ "14.2 Component Overview - Run-Flat Tires, Audi Pax Tires", page 131

14.1 Component Overview - Alloy Wheel





1 - Tires

2 - Valve

- Always replace.
- ☐ Refer to the ⇒ Electronic Parts Catalog (ETKA) for the allocation of the only valves to be installed.

3 - Wheel

■ Note the assembly instructions.

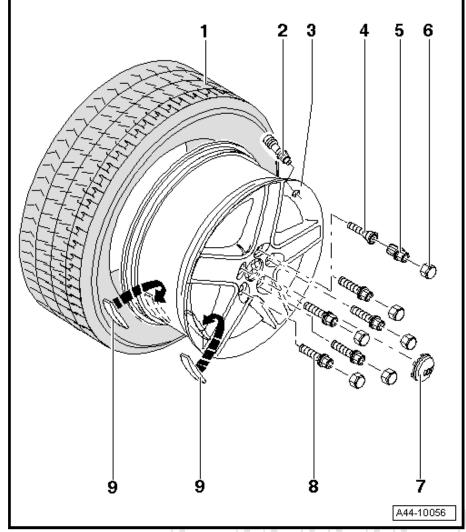
4 - Wheel Bolt

Anti-theft wheel bolts.

5 - Wheel Bolt Adapter

Attach to the wheel bolt intended for it.

6 - Cap for Wheel Bolts





Note

- After achieving and checking the correct torque on "all-wheel bolts", install the caps completely on the wheel bolts.
- Use the back of a screwdriver or a suitable tool to do this. Do not damage the cap.

7 - Cap

8 - Wheel Bolt



Note

Make sure the correct wheel bolts are installed. Refer to ⇒ Electronic Parts Catalog (ETKA) .

9 - Adhesive Balancing Weights

- Maximum 60 grams per rim flange permitted
- Clean wheel where it will be adhered so it is free of dirt and grease
- □ Remove protective film.



☐ Attach balance weights to intended surfaces.

14.2 Component Overview - Run-Flat Tires, **Audi Pax Tires**



It is mandatory for run-flat tires to have a tire pressure monitoring system in the vehicle. Refer to ⇒ "6 Tire Pressure Monitoring System", page 41





- 1 PAX tires
- 2 Support Ring

3 - Wheel for PAX Tires

■ Note the assembly instructions.

4 - Wheel Electronics

- Batteries must be completely replaced.
- Remaining battery life, temperature and pressure can be read via diagnosis with Vehicle Diagnostic Tester.

5 - Metal Valve Body

- ☐ Refer to the ⇒ Electronic Parts Catalog (ETKA) for the allocation of the only valves to be installed.
- Delivered complete

6 - Wheel Bolt

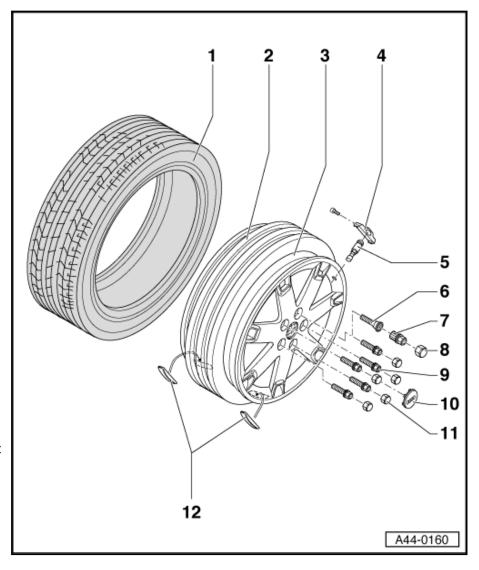
- Note the assembly instructions.
- Anti-theft wheel bolts.

7 - Wheel Bolt Adapter

■ Attach to the wheel bolt intended for it.

8 - Cap

Place on wheel bolt





Note

- After achieving and checking the correct torque on "all-wheel bolts", install the caps completely on the wheel bolts.
- Use the back of a screwdriver or a suitable tool to do this. Do not damage the cap.

9 - Two-Piece Wheel Bolt

□ Note the assembly instructions.

10 - Cap

11 - Cap for Wheel Bolts



Note

After achieving and checking the correct torque on "all-wheel" bolts", install the caps completely on the wheel bolts.







Use the back of a screwdriver or a suitable tool to do this. Do not damage the cap.

12 - Adhesive Balancing Weights

- ☐ maximum 60 grams per rim permitted
- ☐ Clean wheel where it will be adhered so it is free of dirt and grease
- ☐ Remove protective film.
- ☐ Attach balance weights to intended surfaces.





15 Snow Chains

⇒ "15.1 Snow Chains, Assembling and Using", page 134

15.1 Snow Chains, Assembling and Using

Snow chains may be mounted only on the drive wheels.

For AWD vehicles please pay attention to the owner's manual for the vehicle.

Snow chains are not possible with all-wheel/tire combinations. Type and size of snow chains. Refer to the \Rightarrow Owner's Manual; Snow Chains .

If no special snow chain type is specified, a snow chain with small chain links can be used. Only chains which do not stand up more than 15 mm, including chain lock, may be applied on tire tread and inner sides.

With some models and certain wheel/tire combinations, only snow chains with small chain links can be used. Corresponding notes can be found in the vehicle parts certificate table.

The legally permitted maximum speed when driving with snow chains is 50 km/h (31.1 mph).

Remove the snow chains before driving on snow-free roads. It does not make sense to leave them on because the handling characteristics become worse. During this, the tires are stressed unnecessarily and the chain wear is particularly high.







16 **Temporary Spare Tires, Spare Tires** and Recommended Spare Tires

⇒ "16.1 Temporary Spare Tires, Usage", page 135

⇒ "16.2 Spare Tire with Warning Label", page 136

⇒ "16.3 Temporary Spare Tire and Spare Tire, Retrofit", page

16.1 Temporary Spare Tires, Usage

If necessary, inform the customer of the information listed below and refer them also to their vehicle Owner's Manual.

The following notes listed also apply to spare wheels that are marked with a yellow sticker with the note "MAX 80 km/h (49.7 mph)" or "MAX 50 mph".



Note

- The temporary spare tire/spare tire is designed only for temporary and short-term use. Therefore it must be replaced with a standard wheel as soon as possible.
- ♦ After mounting the temporary spare tire/spare tire, the tire pressure must be checked as quickly as possible. The correct tire pressures can be found in the tire pressure table for the applicable vehicle or in the applicable Maintenance
- Always pay attention to the speed rating information for the temporary spare tires ("MAX 80 km/h (49.7 mph)" or "MAX 50 mph").
- Full-throttle acceleration, hard braking and driving rapidly around curves should be avoided.
- Never drive with more than one temporary spare tire/spare
- For technical reasons, it is not permitted to use snow chains on the temporary spare tire.
- If the vehicle must be driven with snow chains, the temporary spare tire must be installed on the rear axle when there is a faulty front wheel. The dismounted rear wheel must then be mounted in place of the faulty front wheel.



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16.2 Spare Tire with Warning Label

If necessary, explain the information listed below to the customer and also refer them to the vehicle Owner's Manual.

The notes listed in the following also apply to spare wheels, for example $6.5\ J\ x\ 17$ with $215/65\ R\ 17$ tires, which are marked with the lettering "MAX 80 km/h (49.7 mph)" or "MAX 50 mph" on a yellow sticker.



Note

- The vehicle may have a spare tire with the above mentioned sticker in place of a temporary spare tire, depending on the vehicle equipment.
- ♦ The temporary spare tire/spare tire is designed only for temporary and short-term use. Therefore it must be replaced with a standard wheel as soon as possible.
- After mounting the temporary spare tire/spare tire, the tire pressure must be checked as quickly as possible.
- ♦ The tire pressures are listed on the tire pressure label on the inside of the fuel filler door and on the driver side B-pillar.
- Always pay attention to the speed rating information on the temporary spare tire ("MAX 80 km/h (49.7 mph)" or "MAX 50 mph").
- Full-throttle acceleration, hard braking and driving rapidly around curves should be avoided.
- Never drive with more than one temporary spare tire/spare tire
- ♦ For technical reasons, it is not permitted to use snow chains on the temporary spare tire.

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- ♦ If the vehicle must be driven with snow chains, the temporative depends on the rear axie when there is a faulty front wheel. The dismounted rear wheel must then be mounted in place of the faulty front wheel.

Refer to the ⇒ Electronic Parts Catalog (ETKA) for the replacement part numbers.

16.3 Temporary Spare Tire and Spare Tire, Retrofit

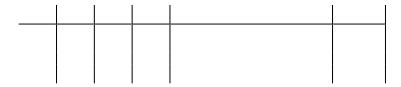
Not all vehicles are equipped with a temporary spare tire or a spare tire or can be equipped with a temporary spare tire or a spare tire.

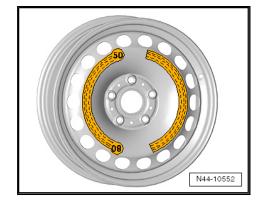
For a possible retrofit, use the part numbers from the \Rightarrow Electronic Parts Catalog (ETKA) .

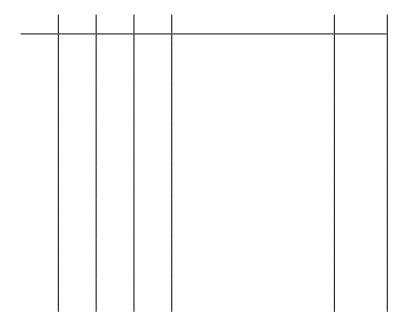


Note

Depending on the vehicle model, the space for a temporary spare tire or spare tire may not be present.











Cautions & Warnings

Please read these WARNINGS and CAUTIONS before proceeding with maintenance and repair work. You must answer that you have read and you understand these WARNINGS and CAUTIONS before you will be allowed to view this information.

- If you lack the skills, tools and equipment, or a suitable workshop for any procedure described
 in this manual, we suggest you leave such repairs to an authorized Audi retailer or other
 qualified shop. We especially urge you to consult an authorized Audi retailer before beginning
 repairs on any vehicle that may still be covered wholly or in part by any of the extensive
 warranties issued by Audi.
- Disconnect the battery negative terminal (ground strap) whenever you work on the fuel system
 or the electrical system. Do not smoke or work near heaters or other fire hazards. Keep an
 approved fire extinguisher handy.
- Audi is constantly improving its vehicles and sometimes these changes, both in parts and specifications, are made applicable to earlier models. Therefore, part numbers listed in this manual are for reference only. Always check with your authorized Audi retailer parts department for the latest information.
- Any time the battery has been disconnected on an automatic transmission vehicle, it will be necessary to reestablish Transmission Control Module (TCM) basic settings using the Audi Factory Approved Scan Tool (ST).
- Never work under a lifted vehicle unless it is solidly supported on stands designed for the
 purpose. Do not support a vehicle on cinder blocks, hollow tiles or other props that may
 crumble under continuous load. Never work under a vehicle that is supported solely by a jack.
 Never work under the vehicle while the engine is running.
- For vehicles equipped with an anti-theft radio, be sure of the correct radio activation code before disconnecting the battery or removing the radio. If the wrong code is entered when the power is restored, the radio may lock up and become inoperable, even if the correct code is used in a later attempt.
- If you are going to work under a vehicle on the ground, make sure that the ground is level.
 Block the wheels to keep the vehicle from rolling. Disconnect the battery negative terminal (ground strap) to prevent others from starting the vehicle while you are under it.
- Do not attempt to work on your vehicle if you do not feel well. You increase the danger of
 injury to yourself and others if you are tired, upset or have taken medicine or any other
 substances that may impair you or keep you from being fully alert.
- Never run the engine unless the work area is well ventilated. Carbon monoxide (CO) kills.
- Always observe good workshop practices. Wear goggles when you operate machine tools or work with acid. Wear goggles, gloves and other protective clothing whenever the job requires working with harmful substances.
- Tie long hair behind your head. Do not wear a necktie, a scarf, loose clothing, or a necklace when you work near machine tools or running engines. If your hair, clothing, or jewelry were to get caught in the machinery, severe injury could result.

Cautions & Warnings

- Do not re-use any fasteners that are worn or deformed in normal use. Some fasteners are
 designed to be used only once and are unreliable and may fail if used a second time. This
 includes, but is not limited to, nuts, bolts, washers, circlips and cotter pins. Always follow the
 recommendations in this manual replace these fasteners with new parts where indicated,
 and any other time it is deemed necessary by inspection.
- Illuminate the work area adequately but safely. Use a portable safety light for working inside or under the vehicle. Make sure the bulb is enclosed by a wire cage. The hot filament of an accidentally broken bulb can ignite spilled fuel or oil.
- Friction materials such as brake pads and clutch discs may contain asbestos fibers. Do not create dust by grinding, sanding, or by cleaning with compressed air. Avoid breathing asbestos fibers and asbestos dust. Breathing asbestos can cause serious diseases such as asbestosis or cancer, and may result in death.
- Finger rings should be removed so that they cannot cause electrical shorts, get caught in running machinery, or be crushed by heavy parts.
- Before starting a job, make certain that you have all the necessary tools and parts on hand.
 Read all the instructions thoroughly, do not attempt shortcuts. Use tools that are appropriate to the work and use only replacement parts meeting Audi specifications. Makeshift tools, parts and procedures will not make good repairs.
- Catch draining fuel, oil or brake fluid in suitable containers. Do not use empty food or beverage containers that might mislead someone into drinking from them. Store flammable fluids away from fire hazards. Wipe up spills at once, but do not store the oily rags, which can ignite and burn spontaneously.

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- Use pneumatic and electric tools only to loosen threaded parts: and fasteners: Neverouse: these int. Copyright by AUDÍ AG. tools to tighten fasteners, especially on light alloy parts. Always use a torque wrench to tighten fasteners to the tightening torque listed.
- Keep sparks, lighted matches, and open flame away from the top of the battery. If escaping
 hydrogen gas is ignited, it will ignite gas trapped in the cells and cause the battery to explode.
- Be mindful of the environment and ecology. Before you drain the crankcase, find out the proper way to dispose of the oil. Do not pour oil onto the ground, down a drain, or into a stream, pond, or lake. Consult local ordinances that govern the disposal of wastes.
- The air-conditioning (A/C) system is filled with a chemical refrigerant that is hazardous. The A/C system should be serviced only by trained automotive service technicians using approved refrigerant recovery/recycling equipment, trained in related safety precautions, and familiar with regulations governing the discharging and disposal of automotive chemical refrigerants.
- Before doing any electrical welding on vehicles equipped with anti-lock brakes (ABS), disconnect the battery negative terminal (ground strap) and the ABS control module connector.
- Do not expose any part of the A/C system to high temperatures such as open flame.
 Excessive heat will increase system pressure and may cause the system to burst.

Cautions & Warnings

- When boost-charging the battery, first remove the fuses for the Engine Control Module (ECM), the Transmission Control Module (TCM), the ABS control module, and the trip computer. In cases where one or more of these components is not separately fused, disconnect the control module connector(s).
- Some of the vehicles covered by this manual are equipped with a supplemental restraint system (SRS), that automatically deploys an airbag in the event of a frontal impact. The airbag is operated by an explosive device. Handled improperly or without adequate safeguards, it can be accidentally activated and cause serious personal injury. To guard against personal injury or airbag system failure, only trained Audi Service technicians should test, disassemble or service the airbag system.
- Do not quick-charge the battery (for boost starting) for longer than one minute, and do not
 exceed 16.5 volts at the battery with the boosting cables attached. Wait at least one minute
 before boosting the battery a second time.
- Never use a test light to conduct electrical tests of the airbag system. The system must only
 be tested by trained Audi Service technicians using the Audi Factory Approved Scan Tool (ST)
 or an approved equivalent. The airbag unit must never be electrically tested while it is not
 installed in the vehicle.
- Some aerosol tire inflators are highly flammable. Be extremely cautious when repairing a tire
 that may have been inflated using an aerosol tire inflator. Keep sparks, open flame or other
 sources of ignition away from the tire repair area. Inflate and deflate the tire at least four times
 before breaking the bead from the rim. Completely remove the tire from the rim before
 attempting any repair.
- When driving or riding in an airbag-equipped vehicle, never hold test equipment in your hands or lap while the vehicle is in motion. Objects between you and the airbag can increase the risk of injury in an accident.

I have read and I understand these Cautions and Warnings.